ARCHIVES OF OTOLOGY.

A CASE OF CEREBELLAR ABSCESS. OPERATION. RECOVERY.

By W. G. RICHARDS, M.B., F.R.C.S.

(With a temperature chart.)

Wm. Afielder, aged six and a half years, was admitted to the Newcastle-on-Tyne Royal Infirmary on August 29, 1900. He had a discharge from his left ear since he was four months old, and measles eleven months ago.

His present illness began somewhat acutely, seven days before admission, with pain in the left ear and cessation of the discharge. During that week his temperature varied between 100° and 102° F.

On admission he was in poor condition and looked ill. The tongue was coated and dry, the lips were fissured, and the teeth were covered with sordes. He was drowsy and could not sit up in bed. He lay curled up on his right side with his head held somewhat firmly rotated and bent over to the left side. There was no discharge from the ear, but there was slight tenderness over the mastoid process. There was no tenderness or swelling over the deep veins of the neck. The ear was syringed frequently with hot boric lotion, and hot fomentations were kept continuously applied.

The temperature and pain decreased steadily during the next few days. The mouth and tongue improved and he seemed to be getting well. In the morning of September 2d a macerated earwig was washed out of the meatus and the discharges became more abundant. In the evening he was not so well and his temperature rose to 102.4° F. In the morning of September 3d the temperature fell to 97° F. and it never rose again above 98.4° F.

Although there was an absence of feverish symptoms and local pain or swelling, yet he remained fretful and rather drowsy. He got gradually thinner and when raised up in bed he held his back

very rigid. He lay in bed on either side with knees drawn up, but he kept his eyes wide open, the upper lids not falling as low as the upper edge of the cornea, giving a strange, staring expression to the eyes. The pupils were normal, but there was slight photophobia.

On September 6th he did not seem so well. There was a total absence of local pain or tenderness, but he seemed to be gradually failing. He could not grasp an object, such as a penny, readily, but came to it with each hand by a wavy course. He found some difficulty in touching the tip of his nose with the index finger of either hand. During the morning the pulse began to intermit one beat in five.

I therefore decided to **operate.** A vertical incision was made from the tip of the mastoid process upwards and then curving backwards. The periosteum was raised over a wide area and the bone was found to be normal. The antrum was then opened with a gouge in the suprameatal triangle ; no pus was found, but there was a little granulation tissue and a small sinus leading backwards and downwards. A trephine was then applied behind the hole already made, and the lateral sinus was exposed. It appeared to be normal, so a farther extension of the opening was made backwards. The needle of an exploring syringe was then thrust through the dura mater, about an inch and a half into the cerebellum, and two drachms of "laudable" pus were withdrawn. A second syringeful (ʒ ij) was withdrawn and then the dura mater was incised where the needle had penetrated, and an opening was thus made large enough to admit an India-rubber drainage tube a quarter of an inch in diameter. When the drainage tube was inserted for about an inch and a half there was a further discharge of two or three drachms of pus. The tube was made to emerge from a hole made for it in the skin flap, and then the flap was sewn in position with silkworm gut. The mastoid antrum was packed with iodoform gauze. The wound was dressed next day and the gauze in the antrum withdrawn. After the third day the wound was dressed daily and the tube was removed, cleaned, and replaced each time. On September 19th the tube was removed altogether. The temperature remained normal from the time of the operation ; the wound healed well ; he took his food and he slept well, and the nerve symptoms disappeared gradually. He regained his weight and went home well on October 9th.

FUNCTIONAL SIGNIFICANCE OF THE ROUND WINDOW.

By Dr. A. FRUTIGER, of Basel.

Translated and Abridged by Dr. J. A. Spalding, Portland, Me.

OPINIONS concerning the manner in which sound is conducted to the labyrinth always have been and still are divided. For this reason, says Bezold: "It is easy to see why both physiologists and otologists should repeatedly return to the investigation of a mechanism, the function of which can only be compared for interest with the refraction of the eye and the accommodation of the lens. Participation in this study by otologists seems additionally justified, since to them alone is given the opportunity to observe in the living those finer alterations in form and function both in the normal and diseased ear, the sum total of which first gives to the physiologist the material by the help of which each separate portion becomes comprehensible in its significance toward the function of the entire apparatus."

To begin with, there is no unity of opinion about the physiological function of the round window.[1] For whilst some assert that waves of sound impinging on the *Mt* pass via the ossicles and the O.W. to the labyrinth and that the R.W. serves as a sort of safety-valve to the labyrinthine fluids, others believe that the R.W. must be held responsible for the conduction of sound, and, finally, a third party regards both paths as possible.

The first attempts to gain insight into the NORMAL

[1] R.W. and O.W. will be used for abbreviation instead of constant repetition of the longer words, Round Window and Oval Window.—*Trans.*

functions of the R. W. were made from the standpoint of the *anatomical relations.* Then, thanks to acoustic advances in the past century, *experiments* were made concerning the physiological significance of the separate portions of the sound-conducting apparatus. Now, together with experimental acoustics, the *pathological and anatomical* and particularly the *post-mortem conditions* in ears with normal hearing during life are of the greatest importance in the topic with which we are concerned. Finally, a further contribution to our knowledge of these functions has lately been afforded by Siebenmann's *experiments* of weighting the R.W. membrane with tampons and testing the hearing both before and after the use of such weights as moistened cotton or powdered boric acid.

The general trend of opinion, based particularly on experimental investigations, is against exclusive sound conduction through the R.W. At the same time all authorities agree that the elasticity and mobility of the R.W. membrane are very important. So, too, there is but one opinion about the mechanism of the R.W. membrane. Furthermore, it is agreed that this membrane serves as a safety-valve for concussions of the labyrinthine fluid. But, in opposition to others who give to this membrane only this rôle, Mueller, Rinne, and Weber-Liel claim that it conducts sound independently, though in a slight degree in comparison with the conduction by the ossicles.

These divergences of opinion may be explained by the fact that the interpretation of any experimental result is difficult and depends largely on the experimenter's personal opinion. And, after all, these experiments, laborious and deserving though they may be, are only an approximation toward the consideration of normal processes. There are always coarse imitations of natural conditions, of tones too intense, of dead parts, of openings into the labyrinth or tube, of the influences of unnatural conditions of resonance, etc.

Based now on the above-mentioned foundations, our opinion is *that, normally, conduction through the R. W. does not come much into account, but that this window is a pro-*

tective apparatus for the ear, a yielding wall for the vibrations of the labyrinthine fluids.

Pathologically, however, the conditions are quite different, as we shall soon see, and in discussing the function of the R.W. from this point of view we divide our material into three sorts. First, those cases of isolated disease of the stapes (resp. O.W.) especially in relation to the hearing whilst the patient was alive. For if with total obliteration of the chain of ossicles some hearing remains and simultaneously the R.W. membrane seems intact, the probability of conduction via the R.W. is great. Next we must discover whether isolated R.W. disease gives us any clue to its function, and finally whether affections of both windows give any idea of the value of the R.W. alone.

Examination of autopsy-reports in deaf persons in whom some disease of the windows seemed to be the cause of the deafness, shows that total obliteration of both windows is accompanied with total deafness. To cite cases which prove this would carry us too far. A bibliography can be found in Panse's paper.[1] How many, however, of these cases may have been due to *nervous alterations* must be a subject for further research.

Isolated disease of the R.W. has not often enough been observed to enable us to draw safe conclusions. Panse refers to ten, which on examination shrink to seven. He thinks that, considering the numerous variations found at the R.W. by Weber-Liel, we can hardly consider the alterations cited as pathological or as responsible for the clinical symptoms.

Let me here cite a case from v. Troeltsch. After a heavy cold, deafness ensued and increased steadily for seven years. Low voice close to the ear, and watch on contact. Autopsy: right ear *Mt* bluish gray, mucosa hypertrophic, ossicles movable, bands of adhesion to promontory. Entrance to R.W. obstructed with rigid connective tissue and abundant capillary meshwork. R.W. membrane thickened. Left ear: hammer and anvil separable only by force. Stapes not quite so rigid. R.W. membrane $\frac{1}{2}$ *mm* thick, with abundant vessels. Cochlea, with pigment.

[1] Deafness from rigidity of the tympanic windows, Jena, 1897.

If we cannot utilize isolated affections of the R.W. in judging of its function, observations of stapes anchylosis must always be of the greatest interest. For it has been shown that in post-mortem anchylosis of the ossicles, but intact R.W. membrane, the hearing may be greatly reduced, whilst perception for words spoken loud and close to the ear remains. Politzer explains this by assuming that with immobility of the ossicles sound can reach the labyrinth by bone-conduction, and that the motion so given to the labyrinthine fluid can extend toward the R.W. This view seems favored by cases of extreme deafness, in which words through a trumpet cannot be heard, whilst the same words spoken loud and close to the ear can be perceived without artificial aid. Bing is of the same opinion. For if the R.W. is an antagonistic opening to the O.W., as seems probable from the form of the R.W. membrane and its more extensive excursions toward the tympanum than in the opposite direction, as shown experimentally, it is, obversely, no less true that the O.W. is the antagonistic opening of the R.W. Therefore, if the O.W. is occluded, sound cannot be transmitted through the R.W. to the labyrinth, as is claimed by our opponents.

These opponents, Voltolini, Lucae, Moos, and others, seek to base their view on cases of bilateral anchylosis of the stapes with total deafness in one ear, yet slight in the other. That is to say, the autopsy shows on the side of the deaf ear some alterations in the R.W. or its membrane, whilst on the other side these seem intact.

Lucae thinks that a movement of the labyrinthine fluid towards the R.W. is not necessary, as Politzer assumed for the direct extension of musical tones through the bones of the head, and proved it in a case of malformation with no windows at all, yet a bell could be heard by bone conduction. Voltolini saw a woman, æt. forty-nine, totally deaf in the right ear, but hearing a loud voice and watch at one inch in the left. Bilateral stapes-anchylosis. On the right side a jelly-like plug in the R.W. niche and on the left an intact R.W. membrane, but the niche filled with connective tissue. The R.W. must have functioned, in Voltolini's opinion, because

no person with good hearing, with meatus occluded, can hear a watch an inch away, as it ought to be heard, if there is such a thing as hearing through the bones of the head.

Politzer's claim for bone-conduction in synostosis of the stapedio-vestibular articulation, in which the patient hears a loud voice, is negatived by an experiment of Weber-Liel, in which during the transmission of sound to a glass tube glued to the temporal bone of a specimen no excursions whatsoever of the R.W. membrane could be seen. He thinks mobility of the R.W. membrane is sufficient to perceive a loud voice and attempts to prove it experimentally in this way. After having been dried, the O.W. niche and the incudo-stapedial articulation are immobilized with wax. Organ-pipe sounds outside the meatus with the tympanum occluded failed to move the membrane, whilst it did move, though less than normal, when speaking or singing voice entered the meatus. The movements were less in living people than in specimens because in the latter the aquæductus cochleæ is opened. These observations favor the idea that, pathologically, when hearing through the chain of bones is excluded but where nevertheless some hearing remains, *the R.W. may act vicariously in conducting sound to the labyrinth.* The aquæducts, which normally serve as safety-valves, may pathologically serve in a similar manner for minimal vibrations of the labyrinthine fluids. But, normally, the aquæducts cannot make the R.W. wholly indispensable, because the movements of the labyrinthine fluids towards that window can, owing to the minute space at hand, only be slow and gradual.

Siebenmann believes that the R.W. membrane may be utilized, normally, for some degree of hearing. Filling the R.W. niche with fluid or sinking it below the level of a tympanic exudate reduces the hearing but little. In tubal catarrh the hearing can be increased by Politzeration to 10 *m* or more for a low voice, even when the exudate rises half way to the top of the promontory.

If we now turn to *experimental tamponade* of the R.W. niche, and the tests of hearing before and after, we can only say that they confirm our opinion of the R.W. functions.

We must, however, distinguish between experimental tamponade with reference to the perception of high tones (Burckhardt-Merian and others) and those (Siebenmann) with reference to the lower tone limit.

Burckhardt-Merian found that where the perception was diminished or where the highest tones were not perceived at all, there was invariably an increased pressure on the R.W. membrane, just as in accumulation of fluid-exudate in the tympanum, and he proved it experimentally by tamponing the R.W. niche with cotton dipped in glycerine. Siebenmann, on the contrary, found the R.W. of no account in aërial conduction of the highest tones. The upper tone limit in one patient was not changed by tamponade. The elevation of the upper tone limit as well as the increased perception for tones of the upper terminal portion of the scale during Valsalva cannot, in his opinion, be referred to increased tension of the R.W. membrane.

This view is strengthened by experiments during tubal catarrh, the upper tone limit being often lowered by Politzeration, although the R.W. membrane, previously relaxed by the intratympanic aspiration, was by the air-douche brought nearer to its original tension, that is to say, made once more tense.

Panse found a case in which the hearing for whispered voice was reduced from $2\frac{1}{2}$ *m* to 30 *cm* after tamponade of the R.W. niche. He recommends tamponade of the middle-ear space when exposed to view in patients, because such experiments are fully as useful as in animals or on specimens.

Another important thing for us to study is the hitherto unknown phenomenon that the perception for low tones can be increased by experimental tamponade, and here I will refer very briefly to three cases of Siebenmann's.

In the first one, tamponade was followed by great improvement for whispers and *by lowering of the lowest tone limit two octaves.* The patient had suffered from scarlatinal otorrhœa and deafness for many years. The discharge had lately returned with pain and granulations. Right ear, loss of hammer handle, *Mt* adherent to promontory and granulations at stapes. Whisper, 3 *cm.* Left ear, granulations in

meatus, *Mt* absent, R.W. niche invisible. Fork a, heard longer by B.C. in the worse ear. Whisper, 2 *cm.* A month later, whisper right ear, 3 *cm*, left 2 *cm*, but insufflation of boric acid improved whisper right to 10 *cm*, left to 5 *cm.* Ten days later, after boric acid tampon had been again applied to right R.W. niche, whisper 100 *cm*, and the *lower tone limit fell two octaves lower from* e flat to E. This increase occurred after every subsequent experiment, but mechanical irritation soon ensued and the experiment was suspended so that we were unable to discover farther, whether B.C. was simultaneously improved with A.C.

This first case suggested to us that the phenomenon depended on pathological alterations in the *Mt* secundaria, but the next case proved that it occurred regularly.

For, in a woman with the residua of scarlatinal otitis, with occlusion of the right O.W., but with the R.W. free and probably a similar condition in the other ear, although the R.W. was not visible, powdered boric acid in the left ear raised the hearing from 15 *cm* to 50, whilst the lower tone limit fell almost an entire octave, from A to B_1.

A third similar case showed more than an octave extension downward of the lower tone limit. In this case there were extensive alterations at the O.W.

Siebenmann refers the increased hearing to insufflation of the powder upon the mucosa and R.W. region and not to pressure on the stapes as has before been assumed. The same may apply to that improvement of hearing so often observed when secretion reaccumulates in cases of residua with perforation.

The favorable influence of tampons on the perception of low tones seems to depend on the fact that weighted membranes vibrate better for lower tones, because the weight makes them vibrate slower. All thin membranes vibrate to all tones, but best to the tone which coincides most nearly in vibrations with their fundamental tone. Unweighted, the tense R.W. membrane is too thin and delicate to vibrate forcibly when low tones impinge upon it directly, and not via the *Mt.* A still better explanation may lie in the tampon at the R.W., obstructing sounds entering the cochlea

through the O.W., and thus giving rise to *reverberation and reinforcement.* Such a view would suit the lower tones, for the reflexion and reverberation of higher tones would produce interference and diminished perception.

We cannot yet decide upon the *therapeutic value* of Siebenmann's discovery, but it will induce us to weight the R.W. membrane for *bass deafness with stapes anchylosis.* Permanent success in our first patient was interrupted by irritative symptoms, but the mucous swelling which even that produced led to marked improvement of hearing without the tampon, which lasted several days whilst the patient was under observation.

Delstanche's successful vaseline treatment of aural sclerosis (these ARCHIVES, xxv., p. 83) seems inexplicable, unless on the basis that the vaseline fills the R.W. niche and weights the membrane there.

We may sum up this paper as follows:

1. Whenever the O.W. is greatly altered pathologically, and the lower tone limit much reduced, hearing for bass tones can be improved by using tampons to the R.W. membrane. This membrane, therefore, seems also to conduct sound from the tympanum to the labyrinth; under NORMAL *conditions, however, only such higher tones, perhaps from the small octave (inclusive) upward.*

2. The R.W. membrane serves, normally, but chiefly in conjunction with the two aquæducts, to regulate the variations in tension of the labyrinthine fluids, namely:

a. In case of wave movements produced in the labyrinthine fluids by tones passing through the chain of ossicles.

b. In sudden shocks produced against the chain of bones by direct or indirect force.

CARCINOMA OF THE EAR.

By Dr. LEOPOLD TREITEL, M.D., Berlin.

Translated by Adolph O. Pfingst, M.D., Louisville, Ky.

THE infrequency of carcinoma of the ear has always been recognized and is again evidenced by a recent report of Bezold, who in 20,000 ear cases observed carcinoma but four times. In recent years a somewhat greater proportion of such cases has been recorded. While the disease may possibly have been more common than formerly, it is more probable that the percentage was raised by the recognition of cases with the microscope whose cancerous condition was formerly overlooked when the microscope was not so universally employed. Judging from the observation of others, it would seem advisable in all cases of chronic otorrhœa occurring in middle life, which show a tendency to recurrent formation of granulation tissue, to make a microscopic examination of the pathological structure. Cases are on record which were not recognized as carcinoma until after operation upon the mastoid, presumably for ordinary caries; their malignant character became apparent by the rapid disintegration of the edges of the wound.

In consideration of the infrequency of carcinoma of the ear, I feel justified in presenting three cases which have come under my observation in the last two years:

Case 1.—Male, fifty-five years old, was seen by me in April of 1896. He had double chronic otorrhœa since childhood, which had become more profuse and watery in the last few months, particularly on the left side. The chorion of both ears was thickened, livid,

and scaly, resembling a frost-bitten part. The ear canal was narrowed by thickening of the soft parts. After removal of pus from the left canal, the tympanic cavity was seen to be filled with granulation tissue. This rapidly returned after cauterization and remained unaffected by treatment with absolute alcohol. My suspicion of its malignant nature was first aroused when, after a longer absence from the clinic than usual, the patient returned with the auditory canal half filled with granulation tissue. Its malignancy was subsequently established with the aid of the microscope. At about this time the clinical aspect of the case changed, marked pains developed over the mastoid region, although there was an absence of swelling over the bone itself. The swelling was confined to an area between the mastoid process and the lower jaw, which was also spontaneously painful. The patient would not yield to an operation and the condition went from bad to worse. In January, 1897, complete paralysis of the left facial and of the recurrent laryngeal nerves had developed. About the same time several deep-seated abscesses formed in the neck, one of which was opened through the mouth, the other from without. The patient complained of pain in the occiput, and occasionally on the right side of the head. He died in May, 1897, of general exhaustion. The hearing had been destroyed early in the disease. Dizziness was complained of but once and at no time was there any nausea or vomiting.

The autopsy showed involvement of a much larger area than was suspected. The disease had spread, particularly in the direction of the occiput. Upon removing the apparently healthy brain, the posterior fossa of the skull of the left side and the basilar process were covered with a yellowish grumous mass. Beneath this, the dura was intact. After its removal, the soft growth of the bone could be seen. The process could be traced as far forward as the spheno-maxillary fossa, which was filled with a tumor mass. The entire mastoid and neighboring squamous bone was converted into one mass. Upon removing the firmly adherent dura from over the tegmen tympani, the same tissue was seen filling out the entire tympanic cavity, the ossicles being absent. On the inner wall of the tympanic cavity the exposed facial nerve could be seen. The carotid artery, after becoming greatly narrowed, terminated abruptly in the growth at a point corresponding to the position of the tip of the petrous bone. Only a vestige of the lateral sinus could be found. A micro-

scopic examination showed the tumor to be a typical alveolar carcinoma with pronounced epithelial pearls.

CASE 2.—A well preserved female, seventy-seven years old, whose history could be traced back seventeen years, when an otorrhœa of the left side began, which existed until her death. The diagnosis of carcinoma was made in August, 1891, at the University Clinic of Berlin, where she was treated by local medication (pulv. sabinæ). When I first saw her the entire ear canal was filled with rather firm, grayish-red vascular tissue. There was some tenderness over the tip of the mastoid and a small gland could be felt at the angle of the jaw. Portions of the mass filling the ear canal were subjected to microscopic examination and were found to be made up of numerous acini, lined with cubical or cylindrical cells. No flattened epithelium or epithelial pearls were found. Where portions of the tissue were removed, the gaps were rapidly filled by new growth. Notwithstanding this exuberance, the disease showed no tendency to spread to the auricle. As the case progressed, numerous deep-seated abscesses developed in the side of the neck, which had to be evacuated. Metastatic abscesses had also developed in the lungs and the right thigh. The patient finally died in November, 1898, of meningitis. The cause of the meningeal inflammation could not be determined, as the tumors were sharply defined and had nowhere perforated the dura or caused erosion of the bone. The microscopic examination made after death corresponded on the whole with the previous investigation. The glandular character was less marked in the last specimen and some nests of epithelial cells were visible.

CASE 3.—A female, aged sixty-three years, applied for treatment for a hemorrhage from one of the ear canals, so profuse that an otoscopic examination was not possible. Near the external ostium some granulation tissue was visible, while the region in front of the tragus was thickened. The patient gave no history of otorrhœa, but complained of a frequent feeling of fulness in the affected ear, which caused her to pick and irritate the canal. I suspected the presence of a malignant condition but, owing to the presence of blood, could secure no tissue for microscopic examination. After absenting herself from the clinic for six weeks, the patient returned in a much worse condition than at her last visit. A complete facial paralysis had developed upon the affected side. The mastoid was painful and, although not swollen, was tender on pressure. The entire auditory canal was

filled with granulation tissue, which was adherent to the surrounding structures. The tissue was shown by the microscope to be a vascular typical epithelial tumor.

The patient suffered severe pains from which she could get no relief by medication. At her solicitation I finally operated upon the mastoid in the hope of lessening pain. After removing about 1 *cm* of sclerotic bone over the region of the antrum I came upon very vascular granulation tissue. The antrum could not be located, but in its place two sequestra of bone were found and removed, the one presumably from the posterior wall of the ear canal, the other from the tegmen tympani. As the process seemed to extend forward, as was indicated by the passing of a probe, I decided not to proceed further with the operation. The anticipated relief of pain did not follow. The growth, on the other hand, began to spread more rapidly, especially in the direction of the parotid gland, which resulted in a luxation of the lower jaw. Death resulted of general exhaustion in September, three months after beginning of the trouble. A subsequent examination showed that the growth had involved a large area, including the entire squamous bone and all of the mastoid except its posterior border. The sigmoid sinus was empty and collapsed, and the internal carotid artery was partially occluded by a coagulum. Anteriorly the mass extended into the parotid gland. The dura though raised in several places was nowhere perforated. The portion of the tumor involving the parotid differed microscopically from the rest of the tumor in having less epithelial clusters, the epithelium being arranged in parallel columns between bands of connective tissue.

The metastatic tumors found in the pleura were made up of diffusely arranged epithelial cells with a few arranged in nests.

The question of the origin of carcinoma of the ear has always been one of much interest. It bears especially a practical interest on account of the possibility of a prompt extirpation in early diagnosed cases. It is known that carcinoma may spring from the middle or external ear. If it starts in the auricle it can readily be detected. If deep in the auditory canal it is almost impossible to determine whether it took its origin from the canal or the tympanic cavity. The cases on record would indicate that the most common point of origin is the tympanic cavity, for they nearly all give a history of a long-standing otorrhœa — as in

my cases Nos. 1 and 2.[1] The malignant nature of tumors of the ear is oftentimes not recognized until after operation upon the mastoid, presumably for simple caries, when it is indicated by rapid spreading of the destructive process. Of sixteen cases cited from literature by Kretschman eleven were preceded by otorrhœa of long standing. This clinical fact is, however, not evidence enough in favor of an intratympanic origin, for usually by the time the cases are seen the growth has spread so as to make it impossible to determine whether it had its starting-point in the skin of the ear canal or the mucous membrane of the tympanic cavity. The microscope throws but little light on this point, as growths with the formation of epithelial pearls can spring from either place. Although there is still question as to which variety of epithelium normally exists in the middle ear it is known that squamous epithelium grows from the skin into the tympanic cavity in old cases of otorrhœa. This would account for the epithelial character of tumors arising in the tympanic cavity. Undoubtedly there are many cases which spring from the skin of the auditory canal. By the continued irritation of the skin by the pus, it becomes susceptible to the development of epithelioma just as the lips become susceptible in pipe smokers. Eczema of the auditory canal and the auricle, which is not an uncommon accompaniment of chronic otorrhœa, also furnishes a favorable nidus for the development of a malignant condition. The predilection of malignant growths for parts where the skin and mucous membrane meet would further strengthen the belief that the lower end of the ear canal is not an uncommon point of origin of such tumors. If the tumor is of a glandular type we can say almost with certainty that it emanated from the ear canal, as the existence of glands in the mucous membrane of the tympanic cavity has not been proven. Jurka reports a case of primary carcinoma of the auditory canal seen in Schwartze's clinic, which contained characteristic gland acini lined with epithelium. Two similar

[1] In my other case the absence of otorrhœa and the early swelling of the tragus would indicate that it had emanated from the ear canal. The possibility of an origin in the parotid gland and a rapid extension to the auditory canal should, however, not be overlooked.

cases were reported by Haug, one of which he described as simple adenoma. In the other, which he reported as adeno-carcinoma, the patient had noticed the development of a nodule for about a year before presenting himself for treatment. The condition finally became painful, began to grow rapidly and show the characteristic serous exudation on the surface. Haug found that it was limited to the inferior wall of the ear canal anteriorly. The microscope determined the malignant nature of the tumor. It was made up of epithelial cells with a fibrous stroma, portions of which had undergone mucoid degeneration. Near the surface the cells were arranged in parallel pillars while in the depth a number of epithelial pearls were visible. Near the surface sweat glands were also to be seen, some of them beginning to lose their histological characteristics. The outcome of this case was not published.

Haug's other case also gave a history of an excrescence in the ear canal for about a year. The growth was divided into lobules by trabeculæ of connective tissue, plainly visible with the microscope. Delicate bands also entered the lobules and subdivided these into irregular smaller compartments. In them coils and columns of epithelial cells were observed. There was such striking resemblance between these acini and the normal gland structure of the ear that the diagnosis of this case must be looked upon with suspicion.

A case very similar in its pathology to the last was reported by Denker. In a section through the tumor and the membranous canal, which was removed in toto, an enlarged sudoriferous gland and a sebaceous gland were to be seen. Between them the cells were arranged irregularly, showing some resemblance to gland structure. Denker looked upon this as an adenoma in the beginning of a carcinomatous degeneration. From the history of the case the author comes to the conclusion that the malignant condition was superinduced by an attack of influenza. The patient had first observed a wart in the ear canal in 1890. This was removed in 1891 but left an ulcerated surface which was curetted several months later with apparent cure of the condition. The ulcer returned and healed several times after curette-

ment until November, 1893, when after an attack of influenza it began to spread rapidly. When operated upon by Denker in February, 1894, the entire membranous ear canal was involved, extending outward to the helix.

There is no longer any doubt that adenomata often become carcinomatous particularly when the individual becomes debilitated through some constitutional disturbance, as in the case of Denker through influenza. This transformation of adenoma into a malignant growth is so frequent that Birch-Hirschfeld advises a radical operation in every case of adenoma. My case, No. 2, is a representative of this variety of tumor. It had a markedly glandular character and later became infiltrated with epithelial cells, some of which were arranged in typical clusters. The clinical history of invasion of the mastoid and swelling of the glands was further evidence of a malignant condition.

In determining the nature of tumors their clinical course should always be considered, as the microscopical examination is not reliable enough to depend entirely upon it. Ziegler has called attention to the fact that abnormal epithelial developments may take place in the body which may readily be mistaken for carcinoma. This may happen in broken epithelial surfaces which are regenerating—as in wounds of the skin — where clusters and acini of cells develop which show a marked resemblance to the arrangement met with in carcinoma. This would explain the peculiar course of a case reported by Kuhn which to all appearances was cancerous. A small granulating area remained on the posterior ear canal for three and one-half years after a mastoid operation for antral empyema. Notwithstanding its repeated removal and cauterization it always returned. The microscope showed epithelial pegs, dipping from the surface into the depth of the tissue, and in several places epithelial pearls. There was no alveolar or glandular arrangement and during the three years of its existence there was never any glandular enlargement or constitutional symptoms to indicate a cancerous condition.

Kuhn believes that we should not consider cases, diagnosed by the microscope as epithelioma, malignant without

their clinical course. In support of this he cites a case of ulceration of the ear canal with enlargement of glands, diagnosed microscopically as cancerous, which afterward by its rapid cure under mercurial treatment proved to be syphilitic.

The possibility of benign growths becoming malignant gains support in the course of carcinomata of the ear, many of which do not show themselves to be malignant until after opening of the mastoid for abscess or other conditions. In Kretschmann's sixteen cases five were not recognized as malignant until after the mastoid operation, and out of six cases at Schwartze's clinic but half of the number were recognized as such before the operation. One of Kuhn's cases also furnishes a striking example of this kind. A man of fifty-nine years with a history of otorrhœa since childhood was operated upon on account of symptoms of pus retention. The bone was found to be very dense and hard and contained no granulation tissue and little pus. Three months after the operation small hard granulations were observed springing from the depth of the wound. They developed with such rapidity that the patient died two months later. The autopsy showed that the anterior part of the tympanic cavity and the front wall of the ear canal were not involved in the process, indicating that the origin of the growth had been in the wound itself. This case is instructive principally because it shows that the development of cancer may be looked for in cases of mastoid operation with retarded repair.

Many other facts might be enumerated to show how very obscure the pathology of cancer of the ear is today. There are cases on record, for example, which have been reported cured by local applications of alum and powdered savin. The cure was so rapid in one instance that the case will bear brief mention. It was reported by Bürkner. The carcinoma appeared on the drum membrane as a nodule of granulation tissue. Five weeks after its appearance local treatment with savin was instituted and in a very short time the exhuberant tissue had disappeared and the perforation in the drum had closed. Up to the time that the

case was reported—three years after treatment—there had not been a recurrence. The rapid development and cure of this case would lead one to infer that the author was dealing with a simple granulation tumor with a deep epithelial covering and that there had been a mistake in the diagnosis. However, Jacobson also reports a growth which was held in abeyance by similar treatment. A man of thirty-one years had observed a growth in his ear canal for three months which was removed several times, each time to reappear. It finally grew so fast that it filled the entire ear canal and involved the neighboring lymphatic glands. With the microscope it was diagnosed as a typical epithelial carcinoma. Local treatment with alum and powdered savin was employed constantly for fifteen months with the result that the growth ceased to enlarge and the pain abated. While Jacobson attributes this to the local medication, my second case shows that cases may apparently remain stationary for a number of years without treatment of any kind. This case was kept under observation for seven years in which time there was little or no extension.

Billroth has called attention to the slowness of growth of cancer in old persons and believes that the slowness increases as the patient becomes older. Age may have been a factor in the slow development of my case although I am inclined to believe that the tumor was for many years non-malignant (adenoma) and this accounted for its insidious development.

Returning to my cases I would point out several features of interest. The limitation of all of the tumors by the dura corroborate a point made by Kretschmann that tumors often reach the dura but seldom perforate it. A more uncommon feature was observed in the first case in the early paralysis of the recurrent laryngeal nerve, probably brought on by pressure of the enlarged glands of the neck. The condition of the blood-vessels in this case was also interesting. The almost complete obliteration of the sigmoid sinus and the abrupt termination of the carotid at the base of the skull must have developed very slowly as there was never any congestion to indicate a rapid obstruction. When we

know of the frequent encroachment of cancerous conditions of the ear upon the lateral sinus it is surprising that metastatic growths are not more common. But few cases of metastatic tumors with the ear as the primary focus have been reported.

In the prognosis of carcinoma of the ear a point of importance is the early recognition of the condition and an early radical operation. As long as the growth has not extended to the auricle or cartilage of the ear canal a radical operation offers some hope for a permanent cure. In one of Kuhn's cases there had been no return six years after the removal of the membranous ear canal and auricle for cancer of the ear. Denker also had a similar experience. When the mastoid cells have once been encroached upon, Schwartze and others do not approve of operative interference believing that such measures only tend to hasten death.

ADENOID OPERATION ON THE PENDENT HEAD UNDER GENERAL ANÆSTHESIA.[1]

By Dr. P. RUDLOFF, Wiesbaden.

Translated and abridged by Dr. C. Mund, New York.

IN his paper at the third Congress of the German Surgical Society, 1874, Rose suggested the pendent position of the head for all operations in which there would be a tendency of the blood to flow into the pharynx and thus into the air passages. This method of operating at the pendent head, described in vols. xvii. and xxiv. of the *Archiv für Clin. Chirurgie*, excludes the danger of inspiration of blood and fragments of detached tissue. It therefore was readily adopted by the surgeons for operations on the head, neck, and throat, viz., uranoplasty, staphylorraphy, laryngotomy, etc., and is also employed in the operation for adenoids.

The method is as follows: The patient, fully anæsthetized, is put to the end of the operating table in the recumbent position as far as his shoulders, so as to allow the head to hang over the edge of the table. Whilst according to Rose the head is held in a vertical position, I prefer to have it in a slanting, so as to facilitate the introduction of the ring-knife. The left index-finger, protected by a Langenbeck's finger-shield, is introduced into the left angle of the patient's mouth and his tongue pulled forward with a bullet forceps. The extent and situation of the adenoid growth having been located by digital exploration, Boecker's ring-knife is introduced into the pharynx. The cutting edge of the instrument

[1] According to a paper read at the eighth meeting of the German Otological Society, Hamburg, May 19 and 20, 1898.

is applied to the upper and central part of the growth and with moderate pressure moved over the fornix and posterior pharyngeal wall down as far as the attachment goes, after which it is removed with the detached adenoid tissue. A second and a third sweep with the ring-knife, one to the right and the other to the left of the first one, are made. A re-examination of the naso-pharynx now, as a rule, will show that, although the main mass of the growth has been removed, some remnants of adenoid tissue have been left behind at the fornix and in Rosenmüller's fossæ. At times these remnants are situated deep within the fossæ of Rosenmüller, on their anterior wall as far as the eustachian ridge and somewhat below in the groove of mucous membrane, which from here runs downward. The larger remnants, about pea-sized, are now removed with Boecker's ring-knife. The smaller remnants are removed by means of Hartmann's ring-knife in the following manner: Beginning at the entrance of Rosenmüller's fossa, first of one and then of the other side, the instrument is passed along the fornix to the opposite side. Remnants at the tube-entrance and below the fossæ are removed with the same instrument by holding it in a somewhat slanting position, and moving it around the salpingo-pharyngeal fold. Pains must be taken to remove all the remnants. Any forcible pressure is to be avoided, and special care has to be exercised in manipulating the instrument in Rosenmüller's fossæ and about the salpingo-pharyngeal fold.

Tonsils, hypertrophied to any degree, ought to be removed a few weeks before the adenoid operation, as such hypertrophied tonsils associated with adenoids greatly impede breathing and are apt to favor or even produce asphyxia during anæsthesia.

During the operation the blood flows into the choanæ through the nose, and from there into the pail on the floor. In case the blood, owing to the slanting position of the head, should accumulate in the naso-pharynx, and from there ascend into the oral cavity, the assistant pulls the patient's tongue forward and removes the blood by means of a sponge fastened to a forceps. After cessation of the

hemorrhage the patient is lifted to the foot end of the table, placed on his side, having his face turned downward, on an incline so as to allow the dripping blood to flow out through the nostrils. In case of a more profuse hemorrhage the bleeding can readily be checked by means of Bellocque's canula. As soon as the anæsthesia has passed off sufficiently, the patient is directed to open his mouth and his pharynx is examined by inspection, as it sometimes happens that a fragment of adenoid tissue, loosened by the cutting edge of the ring-knife, still remains attached to the posterior pharyngeal wall by a tissue-bridge so to speak. In that case the remnant can be seen at its dependent part in line with the point of the uvula or lower. It then is removed by means of Hartmann's conchotome.

Above I mentioned that in rare cases the adenoid tissue had its origin in the fossæ of Rosenmüller. This statement is in contradiction with the view which Trautmann expresses in regard to this point in Schwartze's text book on *Otologie*, vol. ii., p. 137. According to Trautmann adenoid tissue, although it may fill up the fossæ of Rosenmüller, does not have its origin therein. The specimens exhibited by me during the forenoon session prove, however, the fact that adenoid tissue is found to occupy the eustachian ridge. These observations correspond also with those of other authors, viz.: W. Meyer, Wendt, Disse, v. Lange, Hopmann, Schäffer, Bresgen, Gottstein, and Kayser. Therefore should the indication arise for entering the fossæ of Rosenmüller with an instrument, the operator must be careful to avoid an injury to the eustachian walls.

Of very grave significance in relation to the manipulation in question, is an accident, to which attention has not yet been called by practitioners but by anatomists only (Zuckerkandel and Merkel), viz., the danger of wounding the carotid in operations about the pharynx. In his handbook of topographical anatomy, vol. i., page 407, Merkel, citing the statement of Zuckerkandel relative to the danger of wounding the carotid, adds that this danger really is a great one. The sporadic cases of fatal hemorrhage in connection with adenoid operations mentioned in

literature have induced me to pay special attention to this fact. So far, however, the case described by Schmiegelow is the only one in which an account of a post-mortem was given or in which reference was made as to the possible cause of this grave accident. The case mentioned was a boy twelve years old, who was operated on, not by Schmiegelow, but by some one else. During the operation,—without anæsthesia,— after Gottstein's ring-knife had been introduced into the naso-pharynx three or four times, a severe and almost immediately fatal hemorrhage resulted. The autopsy showed an injury to the lateral wall of the naso-pharynx and a rent in the wall of the carotid just below its entrance into the carotid canal, at a point not corresponding to the part of the pharyngeal wall which had been wounded. A microscopical examination of the wall of the carotid had not been made. The accident probably happened this way: At the moment in which the ring-knife had penetrated the lateral wall of the naso-pharynx the artery, filled to its utmost tension, struck against the rim of the instrument, or the instrument having pierced the lateral wall of Rosenmüller's fossa was forcibly pressed against the artery as it was filled to its utmost tension, and thus the wall of the vessel was severed. The question as to whether possibly a diseased condition of the wall of the artery facilitated this accident or not can only be conjectured.

In consequence of this unhappy event our attention is naturally drawn to the topographical relations of Rosenmüller's fossæ to the carotid artery. Merkel mentions these relations in his handbook. According to his view the connective tissue enveloping the vessels and nerves is blended with the lateral wall of the recessus infundibuliformis to such an extent that in dissecting from without, it is utterly impossible to distinguish where the boundary between the two exists. I have had the opportunity to follow up these relations in a number of specimens which, having all been taken from adults, corroborated the description of Merkel.

This is not the case with children. According to the observations of Disse placed at my disposal, the carotid passes at a certain distance from the recessus infundibuli-

formis and does not approach the wall of Rosenmüller's fossa until after advanced development of the latter. These fossæ are almost fully developed at about the age of five years, and it is after this age that the majority of patients are operated upon. We therefore have to consider these conditions, and it is evident that an injury to the lateral walls of Rosenmüller's fossæ may result in a wounding of the carotid. The possibility of this accident, however, is excluded if in clearing Rosenmüller's fossæ the above method is followed.

Special pains must be taken to perform as radical an operation as possible, and this for two reasons: In the first place, we endeavor to avert a repetition of the operation. Secondly, we have to consider the view expressed by McBride and Delavan, that the occurrence of tuberculosis,[1] a fact confirmed by numerous observers, in the tissue of the hyperplastic pharyngeal tonsil, compels us to operate radically. With this thorough procedure I but very seldom have been obliged to perform the operation a second time. My experience corroborates the statistics confirmed by Gleitsmann, in America, and the results stated by Moritz Schmidt, of Frankfort-on-the-Main, in his text-book.

I sometimes perform the operation without general anæsthesia. The following are the conditions under which I always employ general anæsthesia. In cases of excited and timid children, in children afflicted with nervous complaints, and under certain anatomical conditions of the naso-pharynx, viz.: When the posterior wall and roof of the naso-pharynx form a slight angular bend at the fornix pharyngis instead of having a curved line in running from one into another; furthermore when the anterior atlas prominence projects somewhat into the naso-pharynx. Attention to both of these abnormal conditions was called by Merkel, Zuckerkandel, and others. I observed them chiefly in several cases operated upon by others where repeated operations had proved a failure. A lady, for example, of

[1] HYNITSCH, in his compilation (these ARCHIVES, vol. xxix., p. 357, 1900), found 7 cases of 180, *i. e.*, 4 per cent.

WEX (in the same volume, p. 442) found tuberculosis in 33 cases out of 599, *i. e.*, 5.51 per cent.—H. K., *Editor.*

fifty years of age, had with remarkable patience, put up with such operative procedure for weeks without having been freed of her trouble. With the aid of the method described above, it was an easy matter to thoroughly remove the adenoid vegetations, which were situated in the hollow above the projecting curve of the atlas. These anatomical abnormalities induced Merkel in his description of the anatomy of the naso-pharynx to make the following statement: In consideration of the variation of the anatomical relations in different individuals it is evident that the surgical instruments which we introduce into the naso-pharynx cannot be manufactured with a typical and unchangeable curve, but the curve should be adapted to the case.

To this I may add that we should not only have at our disposal various instruments, in the manipulation of which we are skilled, but we should master different methods of operation in order to select the most suitable for a given case.

TYMPANIC VERTIGO DUE TO OBSTRUCTION WITHIN THE EUSTACHIAN TUBE.[1]

By Dr. WM. P. BRANDEGEE, New York.

UNDOUBTEDLY the most prominent and at the same time the most common and distressing symptom of labyrinthine disturbance is vertigo. Clinicians have for some time decided that this affection may result from or complicate certain disorders which may well be divided into four great classes, that is to say: Vertigo may be incident upon, first, diseases functional or organic, of the heart or circulatory apparatus; second, diseases of the stomach and intestinal tract; third, diseases of the eye; fourth, diseases of the ear. It is not the purpose of the writer, nor is it within the scope of this short paper to touch at all upon vertigo in connection with the first three of these classes, but rather to call attention to the prominence of this symptom in a certain group of aural cases.

Diseases of the internal ear are properly divided into primary and secondary affections, and while the primary disorders are comparatively rare, the secondary affections are quite as comparatively common. Broadly speaking, aural vertigo usually accompanies, when it occurs at all, one or more of the cardinal symptoms which the aural patient presents, that is to say: either impairment of function, perversion of function, otorrhœa or pain. One author has well said that "it is a well-recognized fact that secondary labyrinthine disturbance may occur as a complication or sequel

[1] Read before the Section on Otology, at the N. Y. Academy of Medicine, March 13, 1901.

of changes within the middle ear or Eustachian tube, and that this disturbance requires only treatment directed to the middle ear. This latter fact does not make it less a labyrinthine affection, the removal of the cause being the rational method for overcoming this disturbance." To vertigo, then, as a symptom caused by tympanic change, and this condition in turn induced either by absolute stenosis of or obstruction within the Eustachian tube, and to a rational method of dealing with this tubal affection, I would especially call your attention.

Patients, suffering from labyrinthine involvement due to tympanic change, usually give a subjective history, lasting in most cases over a long period, of co-existing catarrhal disorders of the nose and naso-pharynx, frequent colds in the head, accompanied by more or less temporary impairment in hearing, stuffy sensations or tinnitus in the ear, and finally a gradually progressive deafness in either one or both ears as time goes on.

Such a history is exceedingly common, an almost every-day occurrence to the aurist taking careful notes of his cases. A subjective history, such as I have described should be carefully considered, and a thorough functional and physical examination should always be made. Especially thorough should be the examination of the Eustachian tube, and this can only be attained by the use of the Eustachian catheter and the auscultation tube. The symptom most commonly associated with vertigo is tinnitus, and the histories of the cases reported will well bear out this assertion. It has been observed with these cases of vertigo that when impairment of function has been present, this impairment has usually been very profound, or but scarcely perceptible.

Tinnitus, rather than vertigo, has been the prominent symptom in those cases where only a moderate impairment of function has existed.

A more careful and extended functional examination will reveal impairment or raising of the lower tone limit in these tubal cases, while the upper tone limit remains practically normal, except in those cases where the labyrinth is greatly involved when the upper tone limit is lowered.

Physical examination generally shows a shrunken or retracted drum-membrane with a slight loss of lustre, the long process of malleus foreshortened and on inflation, without which, as I have said, no examination is complete, a stenosed Eustachian tube or one that is decidedly narrowed.

There is no need here of discussing the pathological processes which have brought about this fibrous stenosis or thickening within the walls of the tube and the consequent middle-ear condition. Suffice it to say that frequent venous hyperæmia, mucous membranes swollen and covered by tenacious and viscid mucus, the destruction of epithelium, the formation of new connective tissue, all these factors are to be considered as bearing a part towards the tubal and middle-ear changes.

Viewed from a mechanical standpoint the result of occlusion of, or narrowing within, the Eustachian tube, upon the tympanum, its contents, and the membranous labyrinth, is interesting.

The air within the tympanum is rapidly absorbed when such an occlusion exists, and diminished atmospheric pressure within the cavity, and an increased atmospheric pressure from without, almost invariably cause the ossicular chain to be driven inward, and so a mechanical pressure is directly conveyed to the membranous labyrinth.

Treatment of tympanic vertigo cases, caused by occlusion, should logically be directed then towards restoring the patency of the tube, and this in itself is a direct mechanical process.

But before discussing treatment, a word or two concerning some of the varied forms of this distressing symptom of labyrinthine disturbance. Patients suffering from even the mildest forms of vertigo are pitiable enough, but what must be the condition when the attacks are so constant and so severe that these people are practically cut off from all the ordinary occupations or pleasures of life, when even existence itself becomes a horror.

In one of these cases reported, the type of vertigo was so severe that the patient, a physician in this city, scarcely dared to go out of doors. It was impossible for him to cross

a street without help, and he was obliged to have some kind of support when he assumed an upright position.

Still another case, that of a woman. The attack was of so severe a type that she was confined to her bed the greater portion of the time. On attempting to assume an upright position she would pitch over.

And in still another case, the man could only walk in a dragging and halting manner, and that with the support of a cane, and the guiding arm of a friend.

In the milder cases reported, the labyrinthine involvement although well marked, was described by the patient as being attacks of light-headedness, dizziness or a swimming sensation. Nausea seldom accompanied this disturbance, but was quite frequently noticed at the time of treatment, and was probably due to irritation of the naso-pharyngeal mucous membrane. Unless we have to deal with constitutional diathesis, drugs are of little benefit in this class of cases, and the treatment, as I have already said, must be direct and mechanical, all effort being toward restoration of patency of the tube. The best way of accomplishing this end, to the writer's mind, is electrolysis, following the method devised by Duel of this city.

Right here let it be said, that in dealing with cases of tubal obstruction a great deal of benefit can be derived from the use of bougies whether they be made of whalebone, celluloid, wire or what not, in forcibly breaking down stenoses or in stretching narrow tubes, but the writer firmly believes that electrolysis is by far the best method of accomplishing the end desired.

What are the advantages of the electrolytic method? They are briefly as follows: First, ease of manipulation. Second, a minimum amount of pain to the patient. Third, a minimum amount of trauma to the parts involved. Fourth, thorough destruction of the stricture or occlusion. Fifth, the force necessary is only that sufficient to insure good contact for the current. Sixth, the parts of the apparatus which come in contact with the tube can be readily rendered sterile.

The instruments devised by Duel have been exhibited

here before so that there is no necessity of further description. It may only be said, however, that the smallest bougie is the one to be generally preferred for the first treatment, the larger sizes for subsequent sittings.

When the mouth of the tube is well anæsthetized with cocaine, a result easily obtained when a ten per cent. solution is applied to the part by means of a small pledget of cotton on an applicator, a silver catheter, well insulated by thin rubber tissue and containing the small gold bougie can easily be introduced well into the tube.

The operator can then slowly and almost painlessly pass through any stenoses or narrowing in the tube, and he should be positive that the bougie has passed into the tympanum This is absolutely essential because not infrequently the stricture is met with only at the tympanic orifice.

It should be distinctly understood that electrolysis, not cauterization, of the tube is desired, that to produce this effect, only a very mild current with a comparatively low voltage should be used. When such a current is employed no damage can be done to the epithelium, and the stenosis seemingly melts away.

Not infrequently the patient will notice that the obstruction has been broken down, and that the vertigo has at the same time disappeared.

Experience has taught that it is not well to use the electric bougie too frequently in succession; that no excessive force should be employed, but only that necessary to obtain perfect contact (for the current is doing the work, not the pressure); that inflation by the catheter should not be attempted for at least forty-eight hours after treatment on account of the slight reaction, and for fear of emphysema; again that it is often quite necessary to bougie several times before we obtain a perfectly smooth and patent tube, and finally that catheter and bougie should be sterilized by boiling. After the patency of the tube has been established, air and vapor massage by the catheter is indicated, while attention should be given to the adjacent cavities of the nose, oro-pharynx and naso-pharynx, local surgical procedures being adopted when necessary.

The results following the use of electrolysis in these cases of tympanic vertigo have been surprising, not only to the patients themselves, but it must be admitted also, to the operator, and the only excuse for this paper is that it may bring the method to the attention of other practitioners who desire to rid their patients of a most distressing and annoying disorder.

I beg leave to report the following cases in which the histories have been carefully kept, and although the number may be small, still the marked benefit derived in all of them from electrolysis justifies the confidence placed in the method. Some of these cases are from private practice, while others appeared in the service of Dr. Dench at the New York Eye and Ear Infirmary, where they came under the observation of Dr. Kenefick and the writer.

Cases.

Case 1.—H. T. Male, forty-seven years of age, physician. Patient presented complaining of some tinnitus and deafness following a severe attack of grippe. Vertigo was marked and exceedingly severe. Patient feels as if he were falling forward, and to the right. Cannot practice his profession at all. Vertigo referred to right ear. Cannot go out of doors; dares not cross the street, and desires to give up his practice.

Functional examination—right lower-tone limit 512 vd., left lower-tone limit 32 vd. Upper-tone limit both sides 2.8 Galton. Whisper and acoumeter distance almost normal. Bone conduction both side minus.

Physical examination—some retraction of right membrana tympani, some swelling at mouth of tube, decided foreshortening of the long process of malleus; right tube stenosed, inflation absolutely impossible. Electrolysis by the Duel method done four times within a period of two weeks. Average amount of current three milliampères of 35 volts. Longest time of contact three minutes.

Vertigo has entirely disappeared; the lower-tone limit of the affected side has fallen to 64 vd. Whisper normal, no tinnitus. The patient has lost his worried and anxious look, and walks with firm buoyant step. On the 8th of February last, ten months from the time that he was discharged from the office, the patient

again reported complaining of some light-headedness. Catheter inflation showed slight narrowing of the right tube. Electrolysis twice in one week; result, a patent tube through which air passes perfectly into the tympanum, and the dizziness gone.

The stricture in this case was in the cartilaginous tube just internal to the isthmus.

CASE 2.—K. R. Female, thirty years of age, artist. This is one of the most stubborn cases I have ever had to treat. The aural history was as follows: Deafness both ears seven years. Tinnitus both ears for same length of time, and for past three years vertigo so pronounced that she was unable to get out of her bed, or take any care of her business affairs. Has autumnal hay fever, chronic hypertrophic rhinitis, also chronic naso-pharyngitis.

Functional examination—lower-tone limit right C=128 vd., left C^2=512 vd. Bone conduction both sides minus. Upper-tone limit both sides 4 Galton. Loud voice distance, right 1½ feet, left two inches. Physical examination—catheter and auscultation tube reveal stenosed tube on both sides. Electrolysis by bougie begun promptly, and continued on an average of about three times a month for four months, while inflation was practised steadily. The strictures in both tubes were of the long annular variety, and progress was exceedingly slow. The fact of the matter is that very little in the way of improvement was hoped for or expected. At the end of the first month, however, to my surprise, and to the patient's great relief, the vertigo absolutely disappeared. This patient has been under treatment now for the last two years, off and on, and when last seen, in January of the present year, vertigo was still absent, tinnitus very much better, and confined now to left ear, while the patient is able to hear the loud voice ten feet on the right side, eight feet on the left. The lower-tone limit has slowly fallen on the right side to 64 vd., on the left to 64 vd. Both tubes are patent, but still narrow.

CASE 3.—B. M. Female, twenty-nine years of age, school-teacher. Aural history—deafness right ear two years, left ear slight impairment one month. Tinnitus both ears. Vertigo well marked, of the swimming variety. Malarial diathesis. Functional examination—lower-tone limit both sides 32 vd. Whisper right 12 feet, left 15 feet. Upper-tone limit both sides normal. Physical examination—slight retraction of drum-membrane both ears, more marked on right side. Tubes, right very narrow, left

patent. Electrolysis of right tube done twice in one week, dizziness entirely gone, tinnitus decidedly better, still under observation. This case is of the mild type.

CASE 4.—F. B. Male, forty-two years of age, longshoreman. Specific history of long standing—aural history as follows: Slight impairment of hearing for the last ten months in right ear, tinnitus also in right ear for the same length of time, marked vertigo, referred to right ear, constantly for the last three months. Functional examination—lower-tone limit right 512 vd., left normal, upper-tone limit right 3.8 Galton, left normal. Whisper distance right after inflation, one foot. Physical examination—retracted and dull drum membrane on the right side. Electrolysis right tube done four times. Tinnitus gone; vertigo disappeared entirely, whisper right 25 feet. The stricture was at the inside of the isthmus, and the bougie was passed at intervals of every third week, six times in all.

CASE 5.—S. G. Male, fifty-two years of age, salesman. Aural history—impairment of hearing both sides seven years; constant tinnitus, constant vertigo. Functional examination—lower-tone limit right and left 512 vd. Upper-tone limit right and left 2.8 Galton. Acoumeter heard only on contact both sides. Very loud voice right side two inches, left side 14 inches. Physical examination—dull and retracted drum-membrane both sides. Eustachian tubes both closed. After fourth application of the bougie, tinnitus had disappeared, and the vertigo was absolutely gone. Has been bougied altogether about ten times during six months. A functional test taken on February 13th shows that the lower-tone limit has dropped to 64 vd. on both sides, while whisper distance, not the loud voice, is 12 inches on the right, 3 feet on the left.

CASE 6.—A. J. Female, age forty-six, housewife. Aural history as follows: Impairment of hearing on the left side nine months, tinnitus for same time, vertigo most marked, unable to move without an attendant and very much depressed. Right side practically normal. Functional examination—lower-tone limits on both sides 64 vd. Upper-tone limits normal. Whisper distance, left, four feet. Acoumeter distance, left, 15 inches. Physical examination—left drum-membrane markedly retracted, right tube slightly narrowed; left tube absolutely closed by a stricture which was firmly organized. This patient has been bougied about ten times; the stricture was dissolved, and the patency of

the tube restored after the third treatment, and at that time the vertigo entirely disappeared. Tinnitus was somewhat improved, and her general physical condition markedly benefited. This patient was exceedingly nervous and apprehensive, but now she looks bright, eats well, sleeps well, and is indeed a changed woman.

There are fourteen cases in the series, the six reported in full above show fairly well the different types of vertigo due entirely to tubal occlusion or obstruction within the Eustachian tube.

A CORRELATION OF ONE HUNDRED SUCCESSIVE MASTOID OPERATIONS.

By EDWIN W. PYLE, M.D., Jersey City,

FELLOW OF THE N. Y. ACADEMY OF MEDICINE. ASSIST. SURGEON N. Y. EYE AND EAR INFIRMARY.

THE following facts are taken from the mastoid operations in Dr. Whiting's clinical service (N. Y. Eye and Ear Infirmary). The cases were successive in the writer's experience, either as operator or as assistant, and the object of this report is to make a practical correlation of the peculiarities, the deductions, and the verifications.

Forty-eight of these were in children, the youngest being seven weeks old.

Fifty-two in adults, the eldest being sixty-seven years.

Peculiar to children were thirty-four subperiosteal accumulations, twenty-five cortical perforations, and nine cases in which pus had escaped through the Rivinian fissure only.

Three subperiosteal fluctuations beneath the temporal fascia, seven Stacke, four Bezold, and two brain abscess operations were peculiar to adults.

Pertaining both to children and adults were five secondary operations, in the primary of which only a small portion of the cortex and underlying cellular structure had been removed, thus verifying the wisdom in complete ablation of the mastoid.

Eleven were radical operations (in which the apophysis, posterior canal wall, and ossicular remnants were removed, seven in adults, four in children). Nine of these gave evidences of cholesteatoma, showing the relative frequency of this complication in chronic cases.

Twenty-two were extradural abscesses. Six in children, following exanthemata (sixteen in adults, due to chronic influences).

Five had sinus thrombosis (one adult, two adolescents, two children, ages four and six years), youth having the preponderance, which is against the rule.

In nineteen cases the middle fossa was exposed.

In thirty the sinus was uncovered (twenty-four by erosion, three by accident, three intentionally.) No meningeal irritation followed these exposures. As asepsis could not be perfect from the very nature of purulent wounds, the inference is that the dura possesses a resisting power to pathogenic invasions greater than most protecting membranes.

Unreliability of Symptoms. In four cases a profuse discharge from the external meatus indicated an amount in excess of tympanic possibilities to secrete, and yet the operation revealed no source of supply in the antrum or in the mastoid cells.

In three cases there was no tenderness over the tip and yet the tip-cell only was filled with pus, showing that the absence of this symptom does not always denote the underlying condition, and perhaps emphasizes that antrum tenderness is the more reliable.

Nine had no discharge of pus from the canal. Six had absence of inflammatory symptoms at the fundus to indicate mastoiditis. In one, pain, tenderness, and œdema decided the operation in which were found an epidural abscess and a Bezold's perforation. In another, hemicrania and inability to sleep were noteworthy symptoms and the operation disclosed extensive necrosis of the groove and a perisinuous abscess. In another, the cicatricial membrana tympani was retracted, short process prominent with tenderness and fluctuation over the mastoid, requiring a radical operation to relieve cholesteatomatous products.

In four cases there was obliteration of the post-auricular fold, pain elicited by motion imparted to the cartilaginous canal, also pain by direct pressure over antrum, tip, and medial plate, symptoms generally accepted as pathogno-

monic of furunculosis and mastoiditis respectively. These symptoms were due to post-auricular abscesses in the cellular structure of the auricles, with no symptoms suggestive of canal or mastoid involvement.

No. 84 gave history of an acute aural pain lasting *twelve days*, — temp. 103°, pulse 130. The groove was carious to a large extent, extradural granulations abundant, trabeculæ destroyed, and the process one empyæmic mass.

In contradistinction, No. 90 had mastoid tenderness with history of chronic discharge, had had three chills with temp. ranging from 102° to sub-normal with stupor,— advised operation to save life.

Revelations,— no pus, no sinus complication, no brain abscess, everything negative and made a fine recovery.

Relative to the sinus. In four cases the sigmoid groove approached within $\frac{1}{8}''$ to $\frac{1}{4}''$ of the posterior canal wall, and in two the entrance to the antrum was found only by going up over the groove.

These cases illustrate the invariable presence of an antrum, that the sinus may be anywhere, and would have been violated under the ordinary rules respecting safety within the triangle.

In five cases, the bistoury, held in the usual way to cut with the point, rather than with the long edge, would have endangered vital parts which were unprotected by bone.

In one, necrosis of the cortex was so extensive that in raising the periosteum the elevator impinged directly upon the sinus.

In three cases, in opening the apophysis pus welled up in pulsations without there being any exposure of the sinus, showing the unreliability of this suggestive symptom to denote groove involvement.

In one, respiratory movements of the sinus were alarming. While removing a carious groove the descending portion of the sinus suddenly collapsed, as with an inspiration, then violently ballooned outward with the following expiration and so alternated with little apparent distress on part of the patient. (Jansen, Schwartze, and Körner report cases of the same respiratory character.)

This symptom is conceded to indicate the presence of a clot between the point of aspiration and the torcula, or the admission of aërial embolism. In this case the sinus had not been wounded and the subsequent history disproved the presence of any clot.

Five cases out of five of phlebitic thrombosis verified the observation that when the sinus is surrounded by foul pus, a venous clot may be anticipated.

In three instances there were several rigors without sinus involvement, which is against the usual experience.

Several cases demonstrated the delusive influence of cold in treating mastoiditis.

No. 80 had been relieved by leeches, coil, etc., four months ago. Returned with pain, canal full of pus, a low grade of septic fever, with groove well eroded and sinus covered with purulent granulations. Others demonstrated the uselessness of cold and rest when there was severe hemicrania with tenderness in the cerebellar region.

No. 21 was a child four years old, well nourished, had had purulent discharge four weeks following scarlatina. There was tenderness in the post-cervical region, restlessness from pain, *temperature* 99°. No. 55 was an adult with continued hemicrania, mastoid œdema, cerebellar tenderness and *no fever*.

Operations in both disclosed an extensive osteoporosis with perisinuous granulations, verifying the observation that such pain and tenderness, with little or no fever, are quite pathognomonic of extradural abscess.

Complications.—The relative disproportion between operative cases and cerebral exposures is explained by the complications. For example:

No. 88 was an eleven weeks' old babe, had otorrhœa, carious exposure of two fossæ, epidural granulations towards the bulb and an absence of cortex by dehiscence over the knee, exposing the sinus in the descending portion.

No. 98 was a sinus phlebitis complicating brain abscess of the temporo sphenoidal lobe, from which several ounces of pus were evacuated. Temperature on admission was 104°, partially comatose, motor oculi paralysis, optic neuritis, and

motor aphasia were pronounced. He knew the use of a pencil, but called it "a chestnut." This pathognomonic symptom of brain abscess did not disappear with the operation. Five weeks after, he would use such expressions as "I can't sleep in the sleep," meaning bed.

In two cases the external semi-circular canals were destroyed by caries, with no history of dizziness, illustrating how admirably nature compensates in slow disintegration.

In two the Fallopian canal was eroded to the extent of exposing the nerve in its entire course through the tympanum. In one it was picked up by a bent probe, introduced to protect it in a radical operation, showing the most cautious manœuvres may be attended by danger.

In one case an extensive suppurative perichondritis complicated after treatment, perhaps due to an incision extending inadvertently into the scaphoid fossa, with infection.

In one a round-cell sarcoma complicated middle-ear inflammation.

Results.—The most appreciable was the *rapid physical improvement* that followed relief of pain, and freedom from septic absorption, fostered by hospital care. Generally, those detained the longest made the most satisfactory recoveries, which emphasizes the fact that institutions best equipped to take care of the body, *caeteris paribus*, will obtain the quickest results in healing.

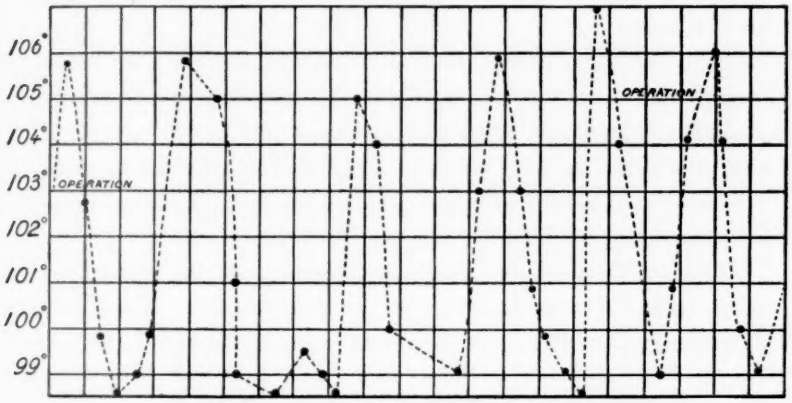
The *average time* in the wards after operation was between five and ten days.

The *most gratifying* and encouraging *cases* were the subperiosteal and the radical operations *in children*. The mortality was 4 %: one adult, of brain abscess, one of leptomeningitis. Two children of sinus thrombosis: one of septic pneumonia, no ligation, the other of longitudinal thrombosis, with ligation.

In every instance an effort was made to perform an absolutely complete operation. An error in this respect may be responsible for one death. Briefly, this child had been twice relieved by Wild's incision; had walked to the clinic with little outward manifestation of ailment. A cholesteatomatous mass was removed and the apophysis thoroughly ablated.

The accompanying chart explains, after verifications, that the patient had on admission, a foul perisinuous abscess and a sinus thrombosis, beneath an apparently normal sigmoid groove, which condition could have been suspected only by a previous temperature record.

There are times when the thermometer gives the only clue for the necessities of sinus invasion. One brain abscess out of two, and three sinus thromboses out of five recovered.



The spaces between dots represent intervals of 2 hours.

Three with partial facial paralysis were *relieved* by operations. Two chronic cases were *followed* by *paralysis;* one, a secondary with extensive necrosis, appeared on the fourth day,—recovered. One twelve hours after operation, from pressure by packing or exudate on an exposed nerve, with recovery.

Four Stacke cases dermatized readily, all discharges ceased and one was relieved of dizziness that had prevented occupation. Three others were greatly improved, subsequent to the dressing period, by irrigation with hot sterilized water, using one to two quarts at a time, by douche sufficiently elevated to give pressure, under the contractive influence of which soft granulations disappeared, and dermatization took place rapidly.

We note here particularly, that in one radical operation complicated by a recurring, foul cholesteatoma, irrigation as above described secured most gratifying results after a long series of patient experimentations with other measures.

Incisions, dressings, etc.—Excepting in the Stacke operations, the integument was invariably incised at right angles to the primary incision, on a level with the centre of the external meatus, extending posteriorly one inch.

This relieved tissue stress consequent upon retraction, facilitated operation by good exposure, and invariably healed by primary union. Iodoform gauze was used in all first dressings, and discontinued thereafter for the plain sterilized variety, unless there were special reasons for stimulating granulations.

In the radical operations the dressings were made mostly through the canal, and at the earliest possible date the auricle was pressed towards the head, to favor posterior healing and to relieve deformity. As soon as granulations would permit, dermatization was hastened by discarding gauzes, dusting with xeroform and admitting air freely.

Transfusions.—The life-giving impetus of the hot normal-saline solution was manifested in four cases. They were administered through the median cephalic vein at a temperature, in the reservoir, varying from 110° to 125°. The most marked reaction followed the transfusion of thirty-two ounces at the last temperature. Experiments have proven that hæmoglobin is not coagulated under 140 degrees.

Conclusions.—The children, numerically four less than the adults, furnished three times as many acute cases; the adults three times as many chronic cases as the children; illustrating that the greater number of mastoid inflammation, sooner or later, demand surgical interference.

Thirty-seven cases of subperiosteal accumulations and eleven adults giving evidences of having had cortical perforations, show clearly the insufficient efforts nature had made to repair, as they had finally to succumb to operative necessities.

Forty-five acute cases furnished 33 per cent. of the intracranial complications, mostly in children, and all lived.

Fifty-five chronic cases furnished 66 per cent. of the intracranial complications, of which four died: illustrating the value of normal periosteums and phagocytic properties of white corpuscles to resist pathogenic invasion and specializing the importance of prophylactic treatment.

Four cases were operated upon, perhaps too early and ill-advisedly, but beyond the possibility of a doubt, ninety-six would have been vastly benefited by earlier operative procedure.

This verifies other experiences and is a deduction well sustained by this correlation.

EMPYEMA OF THE RIGHT MAXILLARY, ETHMOIDAL, AND SPHENOIDAL SINUSES WITH SUDDEN BLINDNESS OF THE LEFT EYE. OPERATION. RECOVERY OF SIGHT.[1]

By T. H. HALSTED, M.D., Syracuse, N. Y.

IT has long been recognized that that important accessory sinus of the naso-pharynx, the middle ear, perfectly analogous to the other accessory sinuses of the nose, is the cause or starting-point of meningitis, brain abscess, and pyæmia, but comparatively little attention has been given to the sphenoidal and ethmoidal sinuses as points of infection and invasion of the brain as well as of the orbit.

The plate of bone separating the sphenoidal sinus from the sphenoidal fissure is of variable thickness, in some skulls in my possession the thickness in places being less than the paper this is written on. Beaman Douglas has recently called attention to the frequent presence of additional air sinuses in the lesser wings of the sphenoid, making still closer the connection between the air-containing sinuses of the nose and the nerves and vessels passing through the sphenoidal fissure; and there pass through this fissure the third, the fourth, the ophthalmic division of the fifth, and the sixth nerves, some filaments from the sympathetic, and the ophthalmic vein. Thinnest of all, however, is the plate of bone which separates the sphenoidal sinus from the optic foramen, transmitting the optic nerve and the ophthalmic artery.

The barrier between all the accessory sinuses of the nose

[1] Read before the American Laryngological, Rhinological, and Otological Society, New York, May 23, 1901.

and the eyeball, the nerves supplying the eye muscles and the optic nerve, is so slight that acute suppuration, empyema, necrosis, and new growths of the sinuses, constantly met with by every rhinologist, must be very frequent factors in the causation of various eye lesions. Holding the skull between one's eye and the light and estimating the thinness of the bone separating the sphenoidal sinus from the optic foramen, one must be struck by the infrequency of reported cases of optic neuritis and blindness resulting from sphenoidal suppuration and abscess, and it must be due to the fact that this sinus and its diseases have been greatly overlooked or underestimated as to their ability to occasion eye diseases.

During the past three to five years, and more especially in the past year, very many cases have been reported showing this intimate relation between sinus disease as a cause and eye lesion as a result, and, without doubt, the sinuses will very soon receive the general recognition they deserve.

The case which I report is of more than usual interest because the suppuration of the various sinuses of the nose was on the right side and gave occasion to no ocular symptoms until suddenly blindness developed on the opposite or left side.

Mrs. G. M., æt. twenty-one years, was brought to my office at 11 A.M. on Nov. 1, 1900, by the late Dr. U. H. Brown. The patient had been under Dr. Brown's care for some time for a catarrhal affection of the right side of the nose, the last treatment being two days before, when the nose was sprayed. The night before I saw her with him she had been to a dancing party, feeling perfectly well and without any symptoms referable to her eyes. Dr. Brown, who was an ophthalmologist, had never, up to this time, had occasion to examine her eyes. This morning, however, she awakened at 6 o'clock, and at once discovered that she was totally blind in the left eye, and early that morning called at his office. He found the following condition of the fundus as taken from his case book: "Exudation into sheath left optic nerve, veins enlarged and tortuous, arteries diminished in calibre. Vision, quantitative perception of light. Nerve head seen best with + 7 D. Left pupil dilated and responds but little to ophthalmoscopic light reflex."

She gave the following history. For about two years she had had some nasal catarrh and had at various times been treated for it by different physicians. Six months ago, while in the Adirondacks, contracted a more than usually severe "cold in the head." The right side of the face at the beginning of it was swollen and tender, quite acute pain over and around the right eye, a profuse, yellowish, and odorous discharge from the right side of the nose. Because of this persistent pain, discharge, and odor, she left the woods and went to Utica for treatment, but remained there but a few days, as she thought she was not benefited, and returned to the Adirondacks, where she remained most of the summer. During the summer there was a continuous discharge of odorous, yellow pus blown from the right side of the nose, with more or less postnasal discharge of the same character, nasal obstruction on the right side, more or less pain over the right eye, especially forenoons, insomnia requiring trional every few nights, general malaise, and occasional chilliness. There was neither pain nor discharge on the left side. On returning to the city in the early part of September, she placed herself under Dr. Brown's care. The Doctor stated that in the two months he treated her she had a very profuse discharge of pus coming from the right middle meatus, but he had not determined its origin. He had never seen any at any time on the left side.

The patient and her husband both remarked that while formerly she soiled during a forenoon five or six large handkerchiefs, this morning less than one had been soiled, and most of this had come from the left side, almost none from the right.

On examining the nose, I found the following condition : *Right side*—general deviation of the septum to the right, greatest deflection being in the upper part. Inferior turbinate swollen. Middle turbinate could not be seen because of the deflected septum and swollen inferior turbinate ; pus covering the latter and coming from above. *Left side* was clear, septum slightly concave, no enlargement, swelling, or pressure of the middle turbinate against the septum or outer wall. No pus in the superior or middle meatus, but there was some on the floor under the inferior turbinate. Slight amount of pus on the posterior wall of the naso-pharynx, but it could not be traced to any definite point. Tonsils slightly enlarged. After using a 10 % solution of cocaine and cleaning away the secretion, I was able to see the anterior edge of the right middle turbinate, and on pressing the septum

over got a fairly good view of the middle meatus, finding that the pus was coming from under the middle turbinate. The probe could not detect bare bone, and in a very few minutes the swollen mucous membrane again obscured the middle turbinate. With electric transillumination, the right maxillary sinus was completely dark, with no pupillary glow, whereas the left antrum was very translucent, the pupil being bright. Both frontal sinuses very translucent. Tenderness on palpation over the right antrum, at the inner canthus, and above the right eye. No fulness to be detected. No pain or tenderness on the left side, but a feeling of fulness and pressure back of left eyeball. The left pupil was widely dilated, did not respond to reflected artificial light thrown into it, but contracted when light was thrown into right eye, showing that the third nerve was not involved. Unable to distinguish objects or count fingers held in front of the eye and could perceive light only out of the outer angle. Distinct exophthalmus, the eye being very perceptibly pushed forward and slightly outward. Right eye unaffected. Temperature, 99.4° F. Pulse, 82. I made a diagnosis of empyema of the right antrum, right ethmoidal and sphenoidal sinuses, with a recent rupture or breaking through of the septum between the two sphenoidal sinuses, allowing the pus to distend the left sphenoidal cavity, causing either a bulging of the outer wall of the sinus, giving rise to a pressure on the optic nerve passing through the optic foramen, or else an actual perforation at this point into the cranial cavity beneath the dura mater, probably the former. Advised an immediate opening of the right sphenoidal sinus, to give drainage and relieve the pressure in the left sinus, as the danger of permanent blindness or of fatal meningitis was great should this relief not be quickly afforded. Dr. Brown concurred in the diagnosis and proposed treatment, and asked me to assume charge of the nasal and sinus part of the case. Dr. Elsner was asked to see the patient with us, and also concurred.

The patient was extremely nervous, constantly and involuntarily catching at my hand during this examination, and Dr. Brown, who had seen a good deal of her during the past two months, assured me that it would be practically impossible to do any operation under cocaine, and that a general anæsthetic would have to be employed. I felt, however, that her assistance and cooperation were essential, and two hours later, under cocaine anæsthesia, and, to prevent hemorrhage as far as possible, the

application of a 10 % solution of suprarenal extract, the **operation** was done. Owing to the deflection of the septum, and the lack of control of the patient, the electric trephine could not be used with any degree of safety. The anterior end of the middle turbinate was first removed by Hartmann's conchotome, Grünwald's forceps, and the snare. The deviation of the septum and the free flow of blood, which the suprarenal only slightly controlled, made this exceedingly difficult. Bryan's chisel and curette were used to enter the posterior ethmoidal cells, and, having gone through these, continued until the sphenoidal sinus was entered. It was impossible to see much during the latter part of the operation, because of the free flow of blood and the increasing disquiet of the patient. The chisel, which was used both to enter the sinuses and to press over the septum, was kept well to the middle line and entered the sphenoidal cavity $2\frac{3}{4}$ inches from the lower margin of the nostril. As it could not be seen, I satisfied myself with the probe that it was entered and desisted from going farther; the opening made was then enlarged. A little pus was found on opening into the posterior ethmoidal cells and later in the sphenoidal, but the hemorrhage was so profuse that not much was to be seen. In an hour the patient went home, and at 8 P.M. was resting quietly. The next day the discharge of pus was most profuse, the eye symptoms no better and no worse. Steam inhalations and hot Seiler's solution was being employed every two hours. From this on, all symptoms began to improve, perception for light increased, and she was able to distinguish objects seen at the outer corner of the eye. On November 8th, a week from the operation, she could count fingers held directly in front of the eye, and the nasal breathing was much improved. Dr. Brown's note: "Vision $\frac{20}{100}$, disc less woolly and more distinct, vision improved, field better." Pus was coming freely from the right side of the nose, none from the left. In the naso-pharynx it was mostly from the right side. Two weeks from the time of the first operation I removed the remaining part of the middle turbinate and was able to probe and syringe the sphenoidal sinus. There was steady though slow improvement in the sight. On November 27th, pus in the right middle meatus being copious, antrum dark under transillumination, I opened into the antrum through the socket of the first molar which was extracted for the purpose. It was found full of pus of the odor of hydrogen sulphide. This was washed out, the cavity packed with iodoform gauze and

dressed daily for a week, after which time a Myles drainage tube was put in place. The discharge now almost entirely ceased from the nose. The antrum was, after this, syringed twice daily with a boric-acid solution, and gave her little trouble. On November 30th, Dr. Brown, who died a few weeks after this, made his last record of the eye condition: "Nerve still pale but more clean-cut edge. V $\frac{20}{70}$ +. Blood-vessels fuller."

On January 2, 1901, the nasal symptoms had almost entirely ceased, there being very little muco-purulent discharge into the naso-pharynx; no odor, nasal breathing good, washing from the antrum clear, but is still wearing the tube. Opening into the sphenoidal sinus free and easily seen. No frontal headache, general health much better. Can read large type with left eye, pupil contracts much better than it did, still some exophthalmos. She now came under the care of Dr. F. W. Marlow for her eyes. His report at this date is: "R V, $\frac{6}{6}$; L V, $\frac{6}{24}$. Not improved by glasses. The pupil acts well, but sluggishly to light. Perimeter shows marked contraction of the field of vision, most marked in the lower half of the field. Colors are recognized, but the field for color is much contracted, especially at the inner and lower portion of the field, where it approaches the fixation point." At his suggestion, Dr. Stephenson applied the mild continuous current, $1\frac{1}{2}$ milliamperes, the positive pole over the eye, the negative over the occiput. Strychnia, which she had been taking for some time, was continued.

March 27th.—After irregular treatment of electricity her vision was $\frac{6}{12}$ partly, the size of the field for both white and colors being not materially changed. The antrum appearing normal, the antrum tube was left out with a view to the sinus closing.

On May 17th, being six weeks since the removal of the antrum tube, the following condition was noted. No pus to be seen anywhere in the nose or naso-pharynx, though patient says there is in the morning a "dropping" in the throat. The openings into right sphenoidal sinus are still free and easily seen, and no bare bone is to be detected with the probe. The opening made through the alveolus into the sinus appears closed, but a very fine probe can be passed through it. She is entirely free from headache, a thing which she had never been free from in two years previously, and the insomnia of two years' duration has entirely disappeared. General health greatly improved, and a gain in weight from 108 to 125 pounds in the six months since first

operation. One can detect, on close examination, that the left eye appears to be more prominent than the right. The pupil reacts well to light and much better than a month ago, though not normally. She can read ordinary type with the left eye, but has to make an effort. Dr. Marlow's report as to the eye at this date is: "L V, $\frac{6}{18}$; color vision normal; pupils equal, left responding actively to the light, apparently as well as the right when the eyes are exposed to the sky, but much less than the right to the ophthalmoscope light reflection in the dark room. The left eye is slightly prominent, this being chiefly evidenced by a more extensive exposure of the sclerotic between the lower margins of the cornea and the edge of the lower lid. Ocular movements apparently normal, but the cover test and also the Maddox rod both revealed a moderate degree of exophoria (4°) and R hyperphoria (1°). The ophthalmoscope shows marked uniform pallor of the disc and diminution of both arteries and veins, the veins being at least as much reduced in size as the arteries. In the right eye the veins and arteries have a relative size of 2 to 1; in the left eye of about $1\frac{1}{2}$ to 1. There are no white lines along the blood-vessels, and the margins of the optic disc are clearly defined."

There are several interesting features in this case. The sudden occurrence of blindness in the left eye without previous apparent implication of the left sphenoidal cavity would make it appear that the septum between the two sides had but recently broken down, or else that the orifice of the right sinus had become suddenly entirely occluded and so caused retention in the left side which may have been diseased for some time. Either supposition would explain the sudden blindness due to bulging of the sinus wall against the optic nerve, causing blindness. Although the blindness and the discovery of the choked disc were practically simultaneous, at the same time optic neuritis might have existed for some time prior to the onset of the amaurosis, as blindness frequently supervenes suddenly or with great rapidity during the course of optic neuritis of long standing. There were, however, no ophthalmoscopic signs that the neuritis had been of long duration, and besides this was the fact of the prompt improvement in vision following the evacuation of the pus and relief of pressure. There were also signs of a recent change in sinus conditions, viz., a sudden diminu-

tion in the discharge from the right side coincident with the amaurosis, and the appearance of pus in the left nasal cavity. These facts all seem to point to the supposition that the blindness and swelling of the optic disc were due to pressure of accumulated pus in the sphenoidal cavity upon the optic nerve passing through the optic foramen.

It would be interesting to know in which sinus the disease began, whether in the antrum, the ethmoidal, or sphenoidal. There is a history of frontal headache, insomnia, and post-nasal discharge existing for at least eighteen months prior to the occurrence of the signs of acute suppuration of the antrum, and I am inclined to think the ethmoidal and sphenoidal disease antedated that of the antrum. I have no doubt but that the deviation of the septum, interfering with nasal breathing and sinus ventilation, had a great deal to do with the causation of the sinusitis in the beginning.

While I have opened into the sphenoidal sinus many times, this was the first time I felt the necessity of opening into it at the first operation, ordinarily removing the middle turbinate and entering the posterior ethmoid and later the sphenoid. In this case it seemed imperative to lose no time in relieving the pressure, as permanent blindness or the patient's death might result from any delay. The deviated septum and the patient's excessive lack of self-control made the operation doubly difficult and extra hazardous. It would have been a much simpler matter to have opened into the left sphenoidal sinus instead of the right because of the deviation of the septum, and I am aware that had the case terminated badly some criticism might have been made for not having done this. The objections to it were that the doing of it meant the removal of a perfectly healthy middle turbinate, the wounding of the ethmoid, and the probable subsequent necrosis of this normal structure. Whereas, by operating on the side from which the disease had its origin, I hoped to cure or improve the ethmoidal necrosis which existed, as well as the sphenoid, and by giving good drainage to this relieve the pressure of the pus in the left cavity, and the subsequent history of the case appears to have borne out the wisdom of this course.

A CASE OF TUBERCULOSIS OF THE EAR, WITH AUTOPSY.

By HENRY L. SWAIN, M.D., New Haven, Conn.

TUBERCULOSIS of the ear is not so frequent a disease in adults as to make a single case entirely without interest. The peculiar features of the present case render it somewhat more remarkable, and so I have ventured to present the details of the history and relation of the pathological findings as briefly as possible.

Mr. S., thirty-seven years old, consulted me for the first time on July 15th, with a history of discharge from the left ear for six months past. The patient believed himself to have taken cold at this time, and since then the ear had continued to discharge profusely. Latterly he had begun to have considerable pain in the ear, and also in the whole of that side of the head. Inquiry developed that he had had a cough for a year and a half of varying severity, accompanied by three separate attacks of hemorrhage from the lungs at periods of about six months. The last attack was at the beginning of the present year just previous to the ear trouble. The physical examination revealed the patient to be in the advanced stages of a general phthisis, and although his nutrition was not bad he was extremely short of breath. His lungs developed a pronounced cavity in the upper part of the right, with indications of further disease in both. He was entirely deaf on that side, but heard the tuning-fork on mastoid in the other ear. The external ear stood a trifle farther from the head than the other, and there was a slight redness and tenderness over the mastoid region. The external canal was in a very irritated and inflamed condition, apparently due to the iodoform gauze which was packed down into the middle ear and canal so tightly as to

effectually prevent any discharge from getting out. The middle ear, after the removal of the gauze, was poorly seen, owing to the narrowness of the canal caused by its swollen walls, but one easily made out a large accumulation of cheesy pus and granulation tissue. A large amount of this matter was scraped out, the patient was told to cleanse the ear thoroughly, using no packing, the expectation being that with free exit to the pus and less pressure from the packing the pain would cease. This latter seemed to be the only indication which we were called upon to meet, for at best the lease of life of the patient was short. We believed in temporizing, notwithstanding the fact that the affection of the ear must be considered as most grave owing to the probable involvement of the inner ear, and to the presence of carious bone discovered as we probed the middle ear.

I saw no more of the patient until July 25th, when I was called to take care of him in the hospital, to which he had voluntarily gone. He reported some lessening of the pain by the treatment which had been given him, but his head and ear again pained him, at times worse than ever, and he was unable to sleep nights from the pain in his head, which never seemed to be quite relieved. He confided to me at this time that he had had discharge from the left testicle for a long time, and that the right was also much swollen and very hard. He first noticed the trouble in the left about five years previous, and it had been discharging more or less ever since. Examination showed it to be discharging freely and the mass soft, while the right was twice the normal size and quite firm. A discharging sinus existed also in it. A more thorough examination of the lungs was then given than at the first interview, which revealed a large cavity in right apex, and the probable existence of smaller nodules distributed all through both lungs. The right lung was diseased down to the lowest part. His sputum and discharge from both the ears and testicles revealed tubercle bacilli. The afternoon temperature was on the first day 100.5°. The ear was externally about the same as before, but a much more satisfactory view of the middle ear could be obtained, and from it we learned that the granulation tissue was in a very thin layer over the promontory wall, and through it bare, hard bone could be felt throughout the entire middle ear, and externally into the canal beyond the annulus. The attic contained some cheesy masses and granulation tissue. With the pain on the vertex becoming daily more severe, and the certainty that the

roof of the tympanum was carious if not sequestered, there seemed nothing to be expected but general meningitis and the exitus letalis. To operate and remove sequestered bone seemed unwise, especially in view of the large masses which are known to form in this class of cases. Indeed, it seemed quite doubtful if we could remove very much of the mass, which showed no signs of being loose, and the part which would be accessible for removal was the least offensive, hence it was deemed wisest to temporize, and by doing a simple scraping with the curette give every possible exit to the pus. This was done, and a large amount of carious material, granulation tissue, and necrosed bone removed from the attic, with the result that in a few days the patient felt partially relieved, and constant care and cleansing kept him fairly comfortable until his death, which occurred from inanition on September 12th. During the whole month he had pain enough to keep him restless and wakeful, although of course some of his uneasiness arose from his other troubles. There never was any meningeal complication.

The **autopsy** revealed general tuberculosis of both lungs, the right being much more affected than the left. There were tubercular deposits in the right kidney, both testicles, and the spleen. On opening the skull there was nothing found abnormal except an enlargement of the petrous portion of the temporal bone. The meningeal membranes were all in order, and the brain showed nowhere any signs of tuberculosis. Corresponding to the elevation on the petrous bone was a marked depression on the surface of the brain, which area was in other respects perfectly healthy.

Regarding the petrous portion of the temporal bone, the anterior side over the part corresponding to the middle ear, as will be seen from the model, was markedly raised up to the extent of about $\frac{1}{4}$ of an inch over an area of $\frac{3}{4}$ by $\frac{1}{2}$ of an inch, and as before stated sufficient pressure had been made by it to make a permanent dent into the brain substance. No tubercles were visible in the pia or dura mater of this region, nor on the surface of the swelling, unless we call the small round nodules which are apparent in the cast, by that name. In this raised area the bone substance is extremely thin and in some places practically wanting. The dura and periosteum were very considerably thickened, as if to put up a barrier to

further progress of the disease, and a tough, fibrous mass they made. From the cross-section it will be seen that a very large mass of the bone, including the walls of the middle ear, the cochlea, external canal, and part of the mastoid region, had become diseased and wellnigh sequestered. This bony mass is hard and flint-like in its feel as touched with probe, exactly as it was during the life of the patient. The auditory nerve is softened from the cochlea out to its exit into the interior of the skull, showing one of the paths which infection may take. Sections for microscopical study have been made in the decalcified tissue from the roof of the tympanum and in some of the more healthy bone. Those from the roof of the tympanum show tubercle bacilli in the coagulation necrosis areas but not in the advancing areas of the process, as is usually the case. The bone proper presented the appearance of melting away, like an iceberg breaking off bit by bit. Huge osteoclasts seemed to be the active agents in this destruction.

In only a few places in this diseased area was the bone separated into a complete sequestrum from the healthy bone. Indeed it would have been hard to find perfectly healthy bone-tissue in any portion of the main part of the petrous bone. The specimen also shows how the very large sequestra, which are reported from time to time as being removed in cases of tuberculosis of younger people, are formed. It also demonstrates how very futile would have been any surgical attempt to remove the mass in this case even if the general condition had been such as to warrant it. Indeed, as I have urged on a former occasion, too much manipulation in the attic of such an ear as this, unless done under the best surgical conditions, namely, detachment of the external ear from behind and pulling it forward so as to completely reveal and lay bare the middle ear, might easily have broken down nature's own barrier and precipitated the fatal issue of the illness by opening up avenues of infection which would eventuate in a meningitis. That the condition could have been so serious and threatening that an attack of meningitis was daily expected in the latter part of July, and yet the patient died six weeks later from other causes, shows in no

uncertain way the effectiveness of the fibrous tissue in resisting the advance of the disease.

It is interesting further to comment that this case is an example of a general infection (probably beginning in the testicles), which might have been aborted by early surgery, and it also shows, when a tuberculosis originates in places other than the lungs and becomes general, how widely it is disseminated throughout the entire system.

For assistance in the pathological study I have to thank Prof. Charles J. Bartlett.

REPORT OF THE MEETING OF THE NEW YORK OTOLOGICAL SOCIETY OF MARCH 26, 1901.

By Dr. H. A. ALDERTON, Secretary.

VICE-PRESIDENT, DR. J. B. EMERSON, IN THE CHAIR.

Dr. James F. McKernon presented a case of **temporo-sphenoidal abscess—operation—cured.**

A. M., age twenty years, native of United States, was seen in consultation February 7, 1901. Upon examination, a profuse discharge of pus was found coming from the external auditory meatus of the left ear. She was unconscious and moaning. Temperature 97.4°, pulse 42, respiration normal. Diagnosis of brain abscess was made, and she was operated upon the following morning. The usual mastoid incision was done, and the mastoid found hard and dense as ivory, the pneumatic spaces being filled with firm bone tissue. Incision in the soft parts was carried forward over the left temple, and the parts retracted. The bone directly over the attic was removed by means of the chisel and rongeur, and a perforation found through tegmen tympani reaching upward into the temporo-sphenoidal region. There was a large collection of pus between the dura and the bone. This pus was very foul in character, and upon being cleared away showed a dura markedly thickened, dark in color, and roughened like a piece of leather. Considerable bone was removed above the original opening and in front, so as to expose all of that portion of the dura that was changed in color. The field of operation was then irrigated with bichloride, 1 to 4000, followed by irrigation with absolute alcohol. The dura was then incised with a scalpel sufficiently to admit the entrance of the index finger. The index finger was introduced into the opening and passed upward and inward toward the temporo-sphenoidal region, and upon being withdrawn was followed by discharge of pus, broken-down

brain substance, and debris; the opening in dura enlarged still further, and the finger introduced and swept around the abscess cavity. The cavity was then irrigated with a saline solution, and packed with equal parts of iodoform and boric acid; gauze wicks made of plain sterilized gauze, moistened with bichloride solution, 1 to 4000, and rolled in equal parts of iodoform and boric acid, were then inserted into the abscess cavity. The cavity was not packed tightly, but loosely, the usual dressing was applied, and the patient taken to her room. For twenty-four hours after the operation the temperature did not go beyond 99.2° F. Pulse was never higher than 64. Patient regained consciousness, talked quite freely, said she was free from pain, and the only abnormal symptom that could be noticed was the presence occasionally of aphasia.

The first dressing was removed at the end of forty-eight hours. Considerable pus and more broken-down brain substance came away. The cavity was again irrigated with hot saline solution, and packed in the manner above described. This dressing was left in for three days, at the end of which time it was removed, and a smaller quantity of pus and broken-down brain substance was found. Upon the third dressing, rubber drainage tubes were used instead of the gauze wicks. At the end of twenty-four hours following, the patient complained of chilly sensations, vomited, temperature rose to 103.4°, pulse to 110, and within four hours after, a subnormal temperature was present, pulse of 54, normal respirations, patient still vomiting. The dressings were removed, and a large collection of pus was found in the abscess cavity, showing that the rubber drainage tubes had not performed their work. The cavity was again irrigated with a hot saline solution, and packed as at first with the wicks rolled in iodoform and boric acid. The case was dressed every forty-eight hours for the next two weeks, at the end of which time the patient was sitting up, and went on to rapid convalescence. At each dressing a smaller quantity of the wick was placed in so as to allow of a collapse of the abscess walls. The patient was discharged twenty-eight days after the operation.

Upon examination of the pus from the external auditory canal, the epidural pus, and that found within the abscess cavity, the predominating infection proved to be that of the streptococcus. In the last few dressings no irrigation was used, as there was no pus present in the cavity. At the present time the abscess cavity

is about 1¾ inches in depth, and admits a piece of gauze wick about the size of one's little finger. The hearing on that side, while much below par, is rapidly improving.

Discussion.—Dr. HEPBURN asked how much hearing existed in that ear. Dr. J. F. MCKERNON: Hears speech about three feet, but hearing is improving. Dr. J. L. ADAMS: No aphasia before operation? Dr. J. F. MCKERNON: History of none. Dr. WHITING stated that every case of brain abscess he had seen that had been irrigated had died. Of course, Macewen irrigates. Was a radical operation done on the middle ear? Dr. J. F. MCKERNON: Yes. Dr. GRUENING: His experience with irrigation has been similar to Dr. Whiting's. Dr. EMERSON: What is the objection to irrigation? Dr. GRUENING: Possibility of causing extension of infection. Dr. J. L. ADAMS: Has had one case recover in which irrigation was done. Dr. BACON: Has irrigated with poor results in cases complicated by lethal conditions, but thinks it possible that gentle irrigation may be safely indulged in, in cases not so complicated. Attributes bad results to the complications and not to the use of irrigation. Dr. COWEN: Any eye symptoms? Dr. J. F. MCKERNON: Does n't know whether there was previous to operation. Has had success in three cases with gentle irrigation where there was purulent discharge or necrotic tissue. Strongly objects to drainage tubes, while he attains good results with wicks, which act as siphons.

Dr. E. GRUENING presented a case of **sinus thrombosis with ligation of jugular.**

In this case a cerebral hernia had developed after an extensive operation upon the mastoid. The patient, who had been presented to the Society last year, was again presented to show the action of contractile collodion upon the encephalocele. At the first demonstration the hernia was the size of a crab-apple. It has now diminished very much under the continuous pressure exerted by the contractile collodion.

Discussion.—Dr. WHITING spoke in favor of drawing together incision, in ligating jugular, by adhesive straps rather than by sutures. Very successful in preventing much deformity. Dr. DENCH spoke in favor of dressing simply as an open wound. Dr. BERENS had same experience.

Dr. TOEPLITZ presented his final model of **tonsillotome.** Has increased strength of blade.

Dr. J. L. ADAMS reported a case **simulating mastoid abscess.**

Discussion.—Dr. WHITING asked as to condition of fundus of the ear. Dr. ADAMS: Bulging of posterior wall prevented a view of the membrane. Dr. BACON asked whether it might not have been a case of grip, the pneumonia occurring as a complication of acute purulent otitis media and acute mastoiditis, and both due to the presence of the pneumococcus. Dr. Adams: Probably not. Dr. ADAMS thought the hot applications might have influenced the swelling.

Dr. SHEPPARD reported a case of **spasmodic stricture of Steno's duct,** due apparently to a catarrhal inflammation of its mucosa.

Mrs. T., aged seventy, has been seen with two attacks, each lasting three or four days, with six or eight months' interval, during which the parotid would rapidly swell at the beginning of each meal, and at least two hours would elapse before the entire subsidence of the swelling. The appearance of the swelling was attended with a very considerable amount of pain, similar to that caused by acids during an ordinary attack of mumps. In this case a small quantity of slightly milky-looking fluid could be pressed out of the duct by running the finger along its course toward the outlet. Each attack was seemingly promptly cured by passing a small-sized Eustachian bougie (celluloid) through the duct, and painting the course of the duct with tincture of iodine, only one such treatment being necessary.

Dr. J. E. SHEPPARD reported a case of **enlarged parotid gland.**

Mr. D., age forty-eight, had mumps in 1883. From then until 1888 recurring enlargement of left parotid gland, lasting only a few days at a time. Since 1888, gland constantly enlarged; so much so as to be plainly visible to the casual observer, the enlargement involving apparently the whole gland, but especially the lower half of it. Patient says that it serves the purpose of a barometer, always enlarging appreciably with the approach of a storm. About the only symptom of which the patient complains, aside from the enlargement, is a slight stinging pain through the gland, of short duration, accompanying the first mouthful of food, the rest of the meal being eaten without discomfort. A small celluloid Eustachian bougie can easily be passed through Steno's duct, and down posteriorly to the lower border of the parotid, a distance of 3¼ inches. Treatment has consisted of the passage of such a bougie once in five or six days, the painting of the inside of the cheek with tincture of iodine, the surface being previously

anæsthetized with 4 % solution of cocaine, and daily massage of the whole gland externally, but thus far without material improvement.

Discussion.—Dr. DENCH asked whether it was possible that it was a neoplasm. Possibly an enchondroma. Dr. SHEPPARD: Would an enchondroma grow larger and smaller? Dr. DENCH: That might be a matter of an intercurrent disturbance in secretion. Dr. SHEPPARD: It certainly grows larger and smaller. Dr. BEHRENS has seen three cases similar to those narrated. Recovered by use of the bougie. In one case the attacks seemed to coincide with attacks of rheumatoid arthritis. Alkaline treatment helped. Dr. TOEPLITZ: No calculus? Dr. SHEPPARD: None apparently. Dr. QUINLAN had a case of paroxysmal enlargement of parotid gland, coinciding with attacks of tonsillitis; would remain distended for one month. Dr. DENCH: Has the gland increased in size during the past six or eight years? Dr. SHEPPARD: Apparently not.

Dr. SHEPPARD reported a case of **sinus thrombosis, with temperature chart.**

Dr. GRUENING reported a case of an **excessive enlargement of the lingual tonsil.**

The patient, a girl of thirteen years, presented a growth of walnut-size, originating at the base of the tongue. It was first noticed when the child was about five years of age, and had been growing ever since, until it interfered with respiration, articulation, and deglutition. The mass was removed with an ordinary tonsillotome. Bleeding was easily controlled by digital compression. The microscopic examination showed that the growth consisted of adenoid tissue.

Discussion.—Dr. GRUENING asked how often adenoids of tongue occur. Dr. BERENS: Thinks they occur in about 25 % of those cases affected with adenoids and faucial tonsils. The removal of these growths in singers is very apt to influence the voice advantageously. Dr. QUINLAN: Rare in children, a condition of adolescence. Regards Dr. Gruening's case as a very exceptional one. Thinks they are due in many instances to compensatory hypertrophy; probably due to mouth-breathing. Excision with the knife is very dangerous, from hemorrhage. Believes in the cold wire snare, used steadily and slowly. Does not believe in the galvano-cautery snare, because of the danger of the formation of senechiæ, to the epiglottis. Recurrence is apt to take place if

the other lymphoid hypertrophies are not removed from vault and fauces, and the patency of the nose must be established as soon as possible. Dr. TOEPLITZ thinks they are not so rare in children. He has not seen them much, but believes that this oversight is due to the use of the laryngeal mirror, in examination of children for lingual tonsil, instead of palpation. Dr. BERENS found them present frequently in cases of adenoids.

Dr. J. F. MCKERNON related history of a case of **temporo-sphenoidal abscess** in a boy.

A. T., boy, aged seven years, was brought to my clinic at the New York Post-Graduate School and Hospital, February 11, 1901.

Physical examination disclosed a purulent discharge coming from the left external auditory meatus. There was a boggy swelling behind the ear in the mastoid region, and an œdematous condition extending upward and forward over the left temple. In the centre of this boggy swelling was a scar showing where an incision had been made at some time previous. The history given was that at two years of age the child had contracted scarlet fever, and since that time the ear had been discharging. Eleven months before coming under observation the child had had a severe earache with swelling back of the ear, and this swelling had been incised by the physician in charge at that time, evacuating quite a quantity of pus, so the mother stated. The child had been vomiting, had been dull and listless, no appetite, complaining of intense pain on that side of the head for a week prior to observation; temperature was 99.6, pulse 94, respirations 28, and operation was advised and accepted. Usual mastoid incision was made, and a quantity of sub-periosteal pus evacuated. Upon opening the mastoid, pus was found throughout. The necrosis principally extended upward and forward, involving the superior and lateral portion of the posterior wall of the bony canal. The incision in the soft parts was extended forward over the temporal region of that side, flaps retracted, and soft bone found at several points, through which pus was exuding; a large sequestrum was removed, involving the roof of the tympanum and superior portion of the bony canal. The removal of this dead bone left an exposure of the facial nerve at two points. The removal of the dead bone was continued upward, and the dura found markedly darker in color than normal. Incision was made in the dura, and a grooved director passed upward and inward; upon being with-

drawn it was not followed by any flow of pus. Through feeling sure, from the discoloration of the dura and brain directly beneath it, that pus existed farther back, the opening was enlarged sufficiently to admit the passage of the index finger, and the finger passed upward and inward for about 2½ in., where it encountered a softened area in the brain substance, and, upon withdrawing the finger, about 4 drs. of pus and broken-down brain substance came away. The cavity was irrigated with a hot saline solution, and drained with wicks rolled in iodoform and boric acid, as in the former case.

The patient was returned to the ward in good condition, and from this time on made an uneventful recovery. At no time during convalescence was the temperature over 100°, and at no time was it subnormal. The abscess cavity was dressed every forty-eight hours, irrigation with a saline being used while any discharge of pus was present. As soon as the pus ceased, the cavity was no longer irrigated, but simply packed with the gauze wicks. The case was discharged from the hospital nineteen days after operation, and at the present writing the abscess cavity has entirely healed, only a firm cicatrix existing to show where the opening in the dura was made. The patient's mental condition is normal, and, save for a slight facial paralysis on that side, he seems to be in as good condition, his people say, as at any time during his previous life.

I wish to call attention in this case to the incision which was made eleven months prior to coming under observation, and the evacuation of the pus in the soft tissue. Had there been at that time a free exposure and opening of the mastoid, I do not believe this case ever would have reached the stage in which it was found, since, when it is thought necessary to do a Wilde's incision, it is certainly necessary to go still farther and open the mastoid, and relieve the patient of the danger of subsequent intracranial involvement.

Discussion.— Dr. GRUENING thought the good result might be due to the low position of the incision in the brain, which promoted natural drainage. Dr. DENCH thought drainage tubes did not always do harm. He had cases recover in which he had used them. Dr. GRUENING spoke favorably of inclosing the gauze drain in rubber tissue. Dr. EMERSON thought Dr. McKernon's method of drainage sounded very plausible, for good results. It acted by capillary attraction.

Dr. DENCH reported a case of **mastoiditis recently operated upon,** in which, although the aural trouble had only existed for about a week before the operation, the mastoid cells were found to be much broken down. In view of the extensive destruction often found early in the disease, Dr. Dench advised that operative interference be instituted very early in these cases. He was of the opinion that the use of abortive treatment was a mistake in many cases.

Discussion.— Dr. GRUENING believes in waiting a reasonable time to confirm the diagnosis, otherwise we might operate unnecessarily. And, in doubtful cases, of doing the operation as an exploratory procedure. Dr. ADAMS reported a case similar to Dr. Dench's case. Dr. SHEPPARD spoke of the significance of swelling of posterior-superior osseous canal wall close to the drum membrane. Believes this forms reason enough for operating.

Dr. QUINLAN reported a case of **peculiar tinnitus.**

Male, aged thirty-eight years, had for four or five years become a sufferer from tinnitus after retiring in the evening, or would have attacks if he lay down during the day. The condition was generally ushered in by a paroxysm of cough and was always unilateral; that is to say, it was heard in the right ear. Careful examination failed to elicit marked changes in audition; there were occasionally vertiginous symptoms. A laryngoscopic view showed no abnormality except a large pediculated tuft of lingual lymphoid overhanging the epiglottis on the right side. This was removed by the snare, and the tinnitus has not returned.

Dr. HEPBURN also reported a case of **tinnitus.**

Had grippe a week or two previously, then tinnitus in the left ear; no pain or other discomfort, but deafness and tinnitus only. Inspection showed muco-purulent secretion in contact with tympanum at inner end of canal and small round perforation in anterior inferior quadrant of the membrana tympani. Cleansing removed discharge, and hearing came up to $\frac{14}{15}$, and tinnitus ceased.

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Present: Drs. Gruening, Emerson, Marple, Cowen, Clemens, Berens, Hepburn, Quinlan, Whiting, Duane, Sheppard, J. L. Adams, McKernon, Toeplitz, Bacon, Dench, Lewis, and Alderton.

REPORT ON THE TRANSACTIONS OF THE SECTION ON OTOLOGY, AT THE NEW YORK ACADEMY OF MEDICINE.

STATED MEETING, HELD MARCH 13, 1901.

President JAMES F. MCKERNON, M.D., in the chair.

(The evening was devoted to the demonstration or description of two electrical instruments as aids to hearing.)

NORTON L. WILSON, M.D.—It was my pleasure a few weeks ago to meet Mr. Hutchinson, at which time he demonstrated to me the usefulness of the Akouphone, and, at a subsequent meeting, the practicability and usefulness of the Akoulalion, an instrument for the instruction of deaf-mutes. Dr. Chambers and myself made practical experiments with these instruments and we are satisfied that they are of merit, and we believe that any instrument of this kind ought to be presented to the medical profession. Therefore, I took the liberty of inviting Mr. Hutchinson to appear before this section of otologists in order to give them an opportunity of examining these instruments. I take pleasure, therefore, in introducing to you Mr. Hutchinson, an electrical engineer of this city.

M. R. HUTCHINSON.—In treating the subject of deafness from the standpoint of a mechanic and engineer, I consider the ear merely as a piece of machinery, subdivided into its integral parts which individually perform certain functions when acting in normal conditions. For several centuries the attention of scientists has been turned toward the partial relief of deafness by the substitution of mechanical contrivances to perform the functions of the mechanical parts that have deteriorated.

In 1840, Marcus Banzer devised an arrangement consisting of an ivory tube over which was drawn a portion of a pig's bladder. This was introduced into the auditory canal. In 1763

Leischevin, in 1815 Autenrieth, and in 1840 Lincke used similar devices, more with the view of protecting the middle ear in perforations of the drumhead than for any auditory aid. In 1848 Dr. Yearsley, of London, found that little pellets of cotton introduced into the ear in many cases enabled the person to hear. Since that time there have been various disks devised, which possess merit for certain classes of deafness. The introduction of a foreign substance into the ear is a difficult undertaking in some cases, as it seems to be quite a hard matter to keep down suppuration. Possibly the most efficient and satisfactory aid to the ear was devised by Enoch Henry Currier, M.A., Principal for the New York Institute for the Instruction of the Deaf, commonly known as a Currier Conversational Tube.

These contrivances have all been of use to a small per cent. of the partially deaf, but there has never before been devised an instrument that would enable those who were stone deaf, or those extremely hard of hearing, to hear to any satisfactory extent. Twenty per cent. of the deaf are not handled to a practical extent by instruments. They may be able to hear sound, but the ability to distinguish between sounds is lacking and they seem beyond hope. The remaining eighty per cent., if handled in a practical manner, can be reached successfully.

In speaking of this eighty per cent., I would divide them into three classes. First, deaf-mutes; secondly, extremely hard-of-hearing; and, thirdly, slightly hard-of-hearing persons.

To the first class belong congenital deaf-mutes, and also persons who are considered totally deaf but could once hear. With the former, although they hear the sound of words, having never before experienced this sensation, they are not able to understand what sound is, and it is a very laborious task at first to get them to distinguish between sounds. Also there is to be contended with the lack of desire on their part to hear, as, never having heard, they naturally do not appreciate what they are missing. This is possibly the hardest class to handle, and it is very rare that anything is ever done with this class after they have reached maturity. With children, however, the case is different. They are attending the magnificent institutions of our country where the most brilliant minds of the age are devoting their lives to the relief of the unfortunate conditions of these children. Their minds are in a receptive condition, and a course of instruction instituted in the regular curriculum of these schools, would enable a competent

teacher to teach the children the meaning of sound, the difference between sounds, the sound of words connected with their meaning,—and being enabled to hear *their own* voices in repetition after the teacher, the children would naturally cultivate a normal tone and perfect articulation, whereas it is rare that a perfectly easy flow of words is accomplished with present systems.

I consider it marvellous that so much has been and is being accomplished in this direction, when it is considered that the pupil neither can hear the sound which he is trying to imitate, nor hear the sound of his own voice in repetition. Let it be thoroughly understood that although a deaf-mute has been thoroughly educated in lip-reading, and can speak himself, when he hears words spoken to him he does not know what they mean.

An analogous case would be that of a person who has always been blind. He knows a table, a book, or a chair by the sense of touch, but if such a person should suddenly receive his sight, he would become totally confused, and it would take a long time and much effort on his part to learn to correlate the image of the thing with the name of that object and have a thorough understanding of these two.[1]

Also, if persons who have been totally deaf for quite a length of time, not having heard the sound of articulate speech for so long a time, naturally forget what words, etc., sound like, and, although they have more of a foundation to build upon than that of the congenital deaf-mute, still it is a matter of practice before they become familiar again with sound, even when presented with such tremendous reinforcement and precise articulation as is accomplished by the Akouphone or the Akoulalion.

I know of many instances where persons that have been totally deaf for a number of years and have forgotten how to understand speech, have, by means of my instruments, again become familiar with words by having practised talking to themselves. In fact, this is the quickest and most satisfactory way of reaching such a case.

To this first classification belongs the Akoulalion, the name being derived from two Greek words, "Akou" to hear, and "Laleo" to speak, and which is intended to convey the idea that by hearing they are taught to speak correctly. This instrument consists of two instruments, known as the Pupil's Stand and the

[1] This is not based on fact. Children born blind from uncomplicated cataract, after successful operation, even as late as in their fifteenth year, learn how to see with amazing rapidity. H. K.

Teacher's Stand, respectively. The Pupil's Stand is provided with two ear-pieces, which are mounted on an electric spring, which clamps the ear-pieces against the ears. On each of these ear-pieces is mounted a pneumatic cushion, which may be removed, if desired, to correspond with the nature of the deafness, as explained later. On this base there are likewise mounted three vertical rods, upon which slides a small hard-rubber carriage, having mounted upon it the receiving instrument, into which the pupil speaks when he wishes to hear his own voice. Connected to the Pupil's Stand is the Teacher's outfit, which likewise has a round base, having mounted upon it a somewhat similar set of vertical rods having a small carriage supporting a similar receiving instrument. The height of the receiving instrument in both cases may be adjusted to conform to the height of the pupil or teacher when using the instrument. To the Teacher's outfit is attached the wire leading to the electric battery, which can be situated anywhere in close proximity to the instrument. The Pupil's Stand is likewise connected to the Teacher's Stand by a three-conductor flexible cord. The phonograph attachment is also connected with the Teacher's Stand. This latter attachment can be adjusted to any phonograph, gramophone, or other talking instrument. It is almost universally the case that one ear has slightly more hearing than the other, and for this reason it is necessary not only to adjust the amount of sound going to or being received by the ears of the deaf-mute, but also to regulate the intensity of the sound delivered to each individual ear. This is a vitally important thing, and alone places the Akoulalion far ahead of any similar device. In alternating instruction by simple, rhythmic music, an appreciation of music is cultivated along with that for articulate speech.

The question naturally arises, what will be the eventual outcome of the course of instruction with the Akoulalion? A person cannot use so large an instrument in the transaction of every-day affairs, and naturally must be able to use a smaller instrument, which can be carried around with him. I will answer this question by stating that the Akouphone, or a small portable instrument, can be made just as powerful as the Akoulalion, but the Akoulalion possesses many advantages in there being a tremendous increase in the articulation of the word and the application of the sound to both ears at once, and the ability of the pupil to hear and speak the words in immediate repetition after the

teacher. So, after having learned the meaning of the sounds, such a person can provide himself with a small portable Akouphone, by means of which he can transact ordinary every-day intercourse. It is likewise a fact that the continued use of the Akoulalion has improved the hearing of quite a large per cent. of the deaf.

It is but natural to suppose that a function which is inactive, when exercised will naturally have a tendency to awaken and perform its natural function more efficiently, provided there is not some destruction of the nerve itself.

I have known many instances of persons being able to hear perfectly with the Akouphone or the Akoulalion who had no appreciation whatever of sound by the ordinary tuning-fork or the shrill Galton whistle. Why this is I do not know, but it is true. I am led to believe, by a very extensive series of experiments with this instrument, that the destruction of the auditory nerve is the only thing that will prevent sound from becoming intelligible. Likewise, persons who, by the tuning-fork tests, have an appreciation of certain notes and a lack of appreciation for lower or higher notes, hear all notes alike with the Akoulalion. Why this is I am likewise at a loss to understand.

The Akoulalion is at its maximum efficiency when in the hands of a competent instructor of the deaf, as he understands the individual handling and instruction of the deaf better than almost anyone else. But the Akoulalion can be used in the private home for the instruction of children during vacation, on lines mapped out by competent teachers.

The second classification consists of those extremely-hard-of-hearing. A person who has been very deaf for quite a while has forgotten how to eliminate the sounds that he does not wish to hear. For instance, when using the Akouphone, which intensifies the sounds tremendously, if three or four people talk in close proximity to the one who is addressing the deaf person, the latter hears a general confusion of sounds, and he is unable to eliminate the sound of the other persons and to concentrate his attention upon what is said by the person who is speaking to him.

Hence, for this class of deafness, the type C instrument is designed, which enables the deaf person to hear *only* what is said by the person addressing him. Also two or more individuals may be present, each with a receiving instrument, into which each member of the company present speaks, and the deaf person can not

only hear what each person says to him, but he can likewise hear the remarks of one of the persons to the other.

This instrument gives a perfectly clear enunciation, and it is a pleasure, not only for the person speaking to be able to talk in a very low tone of voice, and have everything distinctly heard by the deaf person, but it is likewise a pleasure for the deaf person to be able again to enter conversation.

The little receiving instruments are made of aluminum, are always clean and sanitary, and do not retain obnoxious breathing odors. Furthermore, the lower a person speaks, the louder the akouphone delivers the sound to the deaf person. If the receiving instrument is shouted into, the excess of sound is entirely cut off, so that the deaf person is not inconvenienced in the least by having to ask the person to speak in a lower tone of voice, and no detrimental effect is possible upon the ear. There is a little black flexible cord running to each one of the receiving instruments. The deaf person has a small ear-piece about the size of a watch, which is either held to the ear in the palm of the hand, mounted upon a handle, or by a head-band, which holds it in place without manual labor on the part of the deaf person.

The ear-piece can be regulated to suit the case of deafness and intensity of the sound, and is as necessary as it is to focus a field- or opera-glass to correspond to the eyesight of the observer and distance of the object.

A small, dry, pocket storage-battery supplies the necessary electricity to operate the instrument, and this can be readily recharged by the aid of the outfit furnished, without inconvenience or knowledge of electricity on the part of the patient.

After the deaf person has been using this style of instrument for some time, a normal condition is developed in that the hearing is accustomed to receiving sound which is applied to the outside. The use of any aural instrument, which protrudes into the ear, is not only a menace to the healthy condition of the ear, but likewise cultivates what might be termed "near-of-hearing." The same as would be the case if a person would habituate himself to holding a book within two or three inches of the eye when reading. He would become near-sighted. So the ear, having the sounds projected upon the auditory apparatus by a tube extending into the ear, becomes so accustomed to hearing sound delivered in this manner that it is in many cases difficult for them to understand at first with the Akouphone. The ear has to be-

come accustomed again to hearing sound applied to the outside. In many cases this is the ultimate point that can be reached, but there is a tendency in many others for the hearing to be gradually developed to the extent of the person being able later to use an instrument which picks up surrounding sounds within a reasonable range, and transmits them to the ear of the person. Then, again, the person has to learn to eliminate not only the echo in a room or hall of bad acoustic properties, but also the sound of voices he does not wish to hear,—in other words, turn the sound into an intelligible state of affairs.

An analogous case is that of a telegraph operator, who is able to stand anywhere within hearing distance of a telegraph instrument and, in spite of the loud clicking of instruments even closer to him than that which he wishes to read, is able to eliminate the sound of those other instruments and hear only what is said by the instrument he is listening to. But if he leaves the telegraph office for a number of years and returns again, he is not able to do this at once. Not only that, but he is unable to follow any one instrument perfectly, for the reason that he has forgotten how to concentrate his attention on any one particular instrument. But after he has been in that office for some weeks, he can again accomplish the same results as before.

So it is with a deaf person. After having practised listening to one voice at a time, he is able eventually to hear many voices and to eliminate from the chaos of sound all except that which he wishes to hear. Hence it is but natural that many persons who expect immediately to hear with the Akouphone sounds which they once heard when having normal ears are disappointed. With perseverance on their part they will accomplish what they desire.

It has been asked for what kind of patients the Akouphone and Akoulalion are unsuitable as an aid to hearing. An answer is: Children under seven years of age, persons having paralyzed nerves, persons of hysterical temperaments, and people of extreme age.

Briefly stated, the Akouphone is a portable instrument which a large per cent. of the deaf can carry around with them, hear ordinary conversation, and can attend public meetings. This is not accomplished immediately, but the continued use of the instrument will gradually yield satisfactory results. We have an instrument exclusively for the desk of the business man, in which his batteries are being charged all the time when he is not using his instrument; for the dining-room table, so that the host can sit

and listen to the general conversation going on around the table; for the library for similar use; and for the opera, theatre, or church we have the "Opera Outfit." In fact it supplies almost any demand that can be made upon an instrument for the deaf.

It has required the expenditure of thousands of dollars and many years of constant endeavor to place the instrument upon the high plane which it enjoys, and not until it was a thorough success would I allow it to be put before the public.

[After the reading of the paper a number of people more or less hard of hearing, invited not only by Mr. Hutchinson, but by members of the Section, were tried with the Akouphone and the Akoulalion. These experiments awakened a keen interest and not a little approval on the part of the aurists. The latter, however, regret, with the editor of these ARCHIVES, that reporters of two morning papers had found their way into the meeting room and furnished glowing accounts of the session to the lay press. The Otological Section of the New York Academy of Medicine is young and ambitious. The members are eager to acquaint themselves with everything that sounds like progress, but they do not forget the admonition of the apostle Paul: *Prove all things, hold fast that which is good.*—ED.]

STATED MEETING, APRIL 10, 1901.

JAS. F. MCKERNON, M.D., in the chair.

Presentation of specimen of tuberculosis of the ear, with history and autopsy of the case, by Dr. H. L. SWAIN, of New Haven. (Published in full in this number of the ARCH. OF OTOL., p. 230.)

Dr. M. D. LEDERMAN: In listening to the history of this case of advanced tuberculosis affecting the ear, the unusual feature of the course of the disease was the severe pain of which the patient complained.

As a rule, tuberculosis affecting the ear progresses insidiously, without painful manifestations, and the destruction of neighboring tissue is very extensive. It is advisable to examine the discharge bacteriologically in these cases of chronic suppurative otitis, and ascertain the sort of infection we are treating.

Dr. ROBT. C. MYLES: This remarkable case reminds me of one that I was called to see in consultation with a general surgeon and a specialist within the past year. The patient was a young girl who

had been operated upon for tubercular cervical glands, several of which had been removed. This child had destructive changes beneath the skin of the entire mastoid, which was softened; there had been very little fever and practically no pain. The swelling was quite prominent, and there had been at times a slight discharge from the ear. The incision revealed a degenerative process of the whole mastoid and the membranes of the lateral sinus, with granulation tissue. I persuaded the surgeon not to extend the operation too far, and to leave some of the granulations. Some of the bone toward the torcular Herophili was removed. The argument that I used was that "he would break down nature's barrier if he extended the operation farther." The cavity was packed, the patient made an uninterrupted recovery, and is well to-day. The history of the case was remarkable in that there was no fever, and the other symptoms were different from those usually observed in mastoid cases.

Dr. JAS. F. MCKERNON: I should like to say a few words to corroborate the statements made by Dr. Lederman and Dr. Swain. During the past year and a half I have had under observation two cases of tuberculosis of the mastoid, and in one of these there was an entire absence of pain throughout all this period of observation. In one of these cases a radical operation was done upon the mastoid, and the diseased mastoid has not healed yet. In regard to what Dr. Swain says of the breaking down of nature's barrier being an unwise procedure, I agree; but we do not expect to have acute exacerbation of the disease following the use of this surgical measure, when pus is present. I think in tuberculosis of the tympanum without any involvement of the mastoid structures, that simply removing the granulations and dead bone through the external auditory canal will aid greatly. But I am opposed to doing a radical operation in these cases, especially when systemic infection is present.

Dr. H. L. SWAIN: I am glad that the gentleman called attention to the fact that there was so little pain in tuberculous cases, as I wished to emphasize its presence in this case as being unusual.

Tinnitus aurium; some remarks on its causes and treatment.

Dr. THOMAS J. HARRIS, in his paper, referred to the brilliant results that had been accomplished in many branches of otology, and deplored the slow progress that had been made in the treat-

ment of tinnitus. Reference was made to the limited literature on the subject, Politzer and Urbantschitsch being mentioned as the largest contributors, and of recent literature the important article by Panse.

Frequency and Classification.—In 824 cases of ear trouble observed by the writer, 321 of tinnitus were recorded. Emphasis was laid on the importance of proper classification. All cases of tinnitus are due to one or two generic causes, either of some lesion or interference with the function of the sound-receiving apparatus, or some lesion, or other causes, interfering with the sound-conducting apparatus. To the first is given the name *subjective tinnitus*, to the second, *entotic tinnitus*. There is still a third class, called *objective tinnitus*.

Etiology.—Attention was directed to the important rôle played by obstruction to the transmission of sound, whether located in the middle ear, Eustachian tube, or auditory canal, as the causative factor in producing tinnitus. Tinnitus is sometimes met with in persons of normal hearing—*reflex* or *objective tinnitus*. Here muscular spasms of one of the muscles in or adjacent to the ear is the cause. Pressure on the blood-vessels adjacent to the ear may produce a like result.

Diagnosis.—In the diagnosis of tinnitus, a careful examination of the condition of the drum membrane, Eustachian tube, nose, and throat was urged, and especially that the pitch of the noise be obtained by means of the tuning-fork. This, in entotic tinnitus, will be low, c, c′ or c″.

Prognosis.—The prognosis was not regarded so bad as was generally supposed, especially if the condition was dependent upon an obstruction of the sound-conducting apparatus.

Treatment.—The treatment is intimately associated with the differential diagnosis. Much can be done by attention to the nose and throat. The value of establishing the patency of the Eustachian tube was urged. The author employs, in addition to catheterization of the Eustachian tube, the celluloid bougie, and spoke with encouragement of electrical dilatation as recently recommended by Duel. Massage of the drum membrane will often be of value in releasing adhesions. The author's experience in the use of electricity was without success, in spite of the claims made by some reporters. Electrical massage of the drum membrane did not seem to sustain the claims put forward for it. The therapeutic treatment of tinnitus is unsatisfactory. The writer

had found the best results with strychnin, iodide of potassium, and nitro-glycerine; less success with tincture of gelsemium, bromide of potassium, tincture of digitalis, hydrobromic acid, and conium, which had been used without avail. Finally reference was made to the benefit to be obtained in certain cases with suprarenal extract.

Discussion.—Dr. H. L. SWAIN.—I do not know that I have anything special to add to the statements made, but there are one or two points that occur to me. The reader of the paper did not refer to the use of pilocarpin in the treatment of these cases. It used to be the habit in the clinics in Germany, when they did not get good results from the treatment of the conducting apparatus as a routine practice, to place the patients on the electrical treatment and strychnin or pilocarpin injections. In the cases that had distinct involvement of the internal ear or the auditory nerve they used strychnin; where there was little or no involvement pilocarpin was used. They used to get a certain amount of encouragement from this practice. I have followed that plan since as a general rule. Electricity has proven beneficial in a large number of nervous cases, especially in those where there was immediate relief at the time of the electrical séance. The tinnitus is usually relieved by using the cathodal. Pilocarpin or strychnin, when used hypodermatically, was given under the skin of the mastoid, because it was the idea that absorption might occur directly into the lymphatics when introduced at that situation. I am sure that strychnin, when thus introduced hypodermatically, apparently did more good than when it was administered internally, or injected anywhere else. In the internal-ear cases, full physiological doses were given every other day, in ascending doses for a period covering six weeks, with two more of descending doses. If there was no relief at the end of a short time, the case was dropped. Such has been my habit and I get fair results.

As to the use of electricity and the length of time which the patient requires, we are obliged to conduct ourselves *pro re nata*. Some cases require as much as half an hour at a sitting. I do not believe that electricity has been thoroughly tried, under a period of six weeks.

The Doctor did not mention some of the operations done in Boston by Dr. Blake and Dr. Jack, loosening up the adhesions about the stapes; they were often done for the relief of the tinnitus as well as for the improvement in hearing. In many

instances the tinnitus has been completely relieved, when the hearing was only slightly or not at all improved.

Dr. M. D. LEDERMAN.—In reference to the previous speakers' remarks I would like to state that a few years ago I reported a case of labyrinthine deafness, following typhoid fever, which improved considerably under the internal administration of pilocarpin and strychnin in ascending doses. This young girl had been in an asylum for four or five years without any improvement, and after the above treatment for three or four months, she was able to hear loud tones sufficiently well to understand what was wanted of her.

In reference to the treatment of tinnitus aurium we see so many cases which have been treated before ; these cases go the rounds and, naturally, each aurist finds something new. In a number of cases of the neurotic variety the tinnitus aurium is increased by excitement, by noises, etc., and these patients are at times benefited by the internal use of hydrobromic acid. In a recent paper by Dr. Pritchard, of London, observations were made in cases of Ménière's disease ; two or three cases were cited where it was claimed that the tinnitus was improved by the use of this acid. It has been my custom in giving hydrobromic acid, to start with thirty drops three times a day and increase the dose to one drachm three times a day. Have tried black snakeroot which has been suggested and claims made that some benefit was obtained. In some cases the noises were lessened ; in others no relief was obtained.

In a number of instances considerable improvement has followed the treatment through the Eustachian tube of a solution of menthol, iodin, and benzoinol. A pressure, from ten to twenty pounds, is employed through the catheter. The catheter is filled with the solution and some is blown into the tube and middle ear. This treatment is carried out in the chronic variety of middle-ear catarrhal troubles, not in any acute exacerbation, or where there is any danger of infection. Have used this method of treatment regularly and have as yet never set up an *acute* otitis. Never attempt it in an acute case except with extreme gentleness. Lately a two per cent. solution of pilocarpin has been suggested to be applied through the catheter. This must be used with great care because pilocarpin decomposes rapidly unless rendered sterile. The use of the massage arrangement with graduated probe has been employed by Professor Lucae, of Berlin. Have tried this instru-

ment, and must conclude that the German ear will stand more pressure than the American ear. The slightest probing causes excruciating pain. A treatment which has been tried, but without getting pronounced results, is the surgical procedure of making a small incision through the drum, posterior to the handle of the malleus, and making traction with a small hook around this ossicle.

Dr. ARTHUR B. DUEL.—I have found hydrobromic acid or bromide of sodium a most useful temporary remedy in cases of distressing tinnitus aurium. I have never been able to arrest tinnitus permanently by the use of any drug, but have had repeated successes, in cases where the tinnitus was due to Eustachian obstruction, by restoring the patency of the tube by the electrolytic bougie.

Although I have repeatedly tried the galvanic current over the mastoids for the relief of tinnitus, I have met with rather indifferent success so far as permanent cure is concerned. A very large percentage of all cases will have the tinnitus either greatly diminished or entirely stopped, temporarily, by one or the other pole of the galvanic current. I know of no rule for determining which pole to use in a given case, except to try the positive, then the negative, over both mastoids. I have found that the positive externally more frequently diminishes or stops the tinnitus, than the negative. Where the positive fails the negative will usually succeed. Where one pole diminishes or stops the tinnitus, the other almost invariably increases it.

In a few cases where the galvanic current has immediately stopped or greatly diminished the tinnitus temporarily, I have been able to give permanent relief by a long course of treatment at intervals of two or three days.

Dr. JAS. F. MCKERNON: I should like to say a word in reference to therapeutics. Dr. Harris mentioned the fact that Dr. Gomez used hyrobromate of conium in $\frac{1}{60}$ of a grain dose. At that time Dr. Gomez and I were in the same aural service, but I used it stronger, running it up from $\frac{1}{20}$ to $\frac{1}{10}$ grain doses three times a day in cases of marked tinnitus aurium not due to any obstruction of the Eustachian tube but to middle-ear causes. I began with doses of $\frac{1}{10}$ of a grain three times a day. I followed this plan of treatment up in twenty cases. In eight cases the tinnitus disappeared after being under observation for eight months. Five cases were very markedly improved and gave no further trouble. They reported at short intervals and then disappeared from

observation. When the attacks came on they usually followed a full meal. In the seven remaining cases there was no improvement. I think this treatment saves much time in cases where there is no obstruction of the Eustachian tube or adherent ossicles. In a fair number of cases I have gotten temporary results with this drug in the dosage mentioned. I think one of the best drugs to use is iodide of potassium, particularly in those cases not of long standing and where there has been a serous exudate; this drug acts upon it in the same way that it does in the exudate in the pleural cavity. I have had fair success with pilocarpine but not when given in aqueous solution nor in children when going to school, as they take cold so readily during the sweating stage.

The patient should be placed in bed and the drug administered hypodermatically, commencing with $\frac{1}{6}$ of a grain, and it then should be run up to its physiological limit. Keep the patient in bed and keep on increasing the dose of the drug and at the end of six weeks you will know definitely whether you are helping your patient or not, as a trial over a shorter period of time will hardly prove the efficacy of this drug.

In reference to what Dr. Swain mentioned in regard to the separation of the stapedial adhesions for the relief of the tinnitus, I have seen a number of cases that have been operated upon by other aurists, and it does relieve the tinnitus temporarily. But all the cases under observation show that so soon as the adhesions re-form the tinnitus returns with the same amount of intensity and frequency as before. I have practically given up that procedure as a surgical means of relief.

One other point, and this is a ground of contention because it has been distinctly fought against. For the relief of the tinnitus, where the Eustachian tube is wide open, I introduce the negative pole of a galvanic current, passing it up into the middle ear behind the long process of the malleus, using a current of from thirty-five to forty volts, two and a half milliamperes, running it up to six or seven, and leaving it in contact for from four to ten minutes. In cases where there has never been any tightening or stenosis of the Eustachian tube, tinnitus has not only been helped but relieved permanently in a large proportion of cases, unless the patients take cold or contract an acute pharyngeal inflammation later. This particularly applies to old cases. If I am asked how it does it I cannot state whether it is due to a chemical action or to simply vasomotor stimulation. I am positive that it acts

particularly well in cases over fifty years old, where the tinnitus is very distressing, and where the patients have not been able to obtain any previous relief. In these cases where there is relief, in a large proportion of them the relief has extended over a period of two and a half years, the length of time I have been using this method.

Dr. THOS. J. HARRIS: I am grateful for the open way this subject has been discussed. I brought it forward not with any idea of throwing new light upon the subject, but because I believed it was such a practical subject that something of value might be gained in stimulating us to the recording our results and comparing notes. We are not going to learn the value of any one drug by its use in one case, nor can we say that we have succeeded in the use of one drug because the patient says on the day following its use that he is better. We should test it by the permanent results. I have not intended to even attempt to give a résumé of the various remedies that have been used in the treatment of tinnitus aurium. It is quite interesting to think of the different results that have been obtained by different observers. I have tried hydrobromic acid and bromide of potassium in probably fifty cases, and I am confident that I never got any marked benefit from their use; yet equally good observers have obtained at least temporary beneficial effects. I have used these drugs until I got the full physiological effects, and yet the patients return to me and say that their noises are no better.

In reference to the treatment by pilocarpin, I tried it in a number of cases in Dr. Nichol's clinic, some at the office and some at the clinic, and we had a series of failures. I think these cases were kept under treatment at least two and probably three weeks with daily injections; the size of the dose was increased up to the time they obtained $\frac{1}{6}$ or $\frac{1}{4}$ of a grain, and in these cases I cannot say that we got any beneficial results.

I have had no experience with the use of strychnine hypodermatically although I think this is a most valuable drug.

I have had no experience with the use of electricity. At the Manhattan Eye and Ear Hospital, we formerly sent all our cases that had their tinnitus dependent upon nerve disease to the nerve department, and I can say that in those particular cases there were no beneficial results. I am gratified to hear to-night the good results obtained by the use of electricity. According to Jones, we cannot always stop with the use of the cathodal current;

he has been wont to make use of the anodal current as well. Jones says that if one cannot get beneficial results from the first treatment it is useless to continue the experiment.

I did not mention the work of Blake and Jack in breaking up adhesive bands; the results of this procedure are still *sub judice*. It does not promise enough.

Conium, as suggested by Gomez, I have tried in about half a dozen cases, beginning with $\frac{1}{60}$ of a grain and increasing the dose until the physiological effects are produced; giving just as much as the patient will stand. In my cases relief followed in one instance only.

In regard to the use of electricity, referred to by our Chairman, I have had no experience whatever.

Tympanic vertigo, due to obstruction of the Eustachian tube. By Dr. WM. P. BRANDEGEE. Published in full in this issue, p. 205.

Discussion.—Dr. WILSON: I have had the privilege of seeing some of the cases reported by Dr. Brandegee, and should like to add my testimony as to the efficient treatment that was employed. At first I was somewhat skeptical concerning the improvement in these cases. Through the kindness of Dr. Brandegee I saw a number of cases and talked with them, and they all were delighted with the treatment. One man stated that he obtained such great relief from the first treatment that he could hardly wait until time for the next treatment. These remarks encouraged me, and I went home and experimented. I presume I have bougied the Eustachian tube about eighty or ninety times, and find the electric current a most efficient means for breaking down the strictures. If any one present has ever used electrolysis for breaking down the strictures, they can appreciate the feeling as the instrument comes against the stricture. I have also passed it through the lachrymal duct, and it passes there as easily as it does through the Eustachian tube. I have had enough of these cases to know that the treatment is one of great value, and shall continue using it. It does not cure every case of stenosis of the Eustachian tube, but it is the most efficient means of opening the tube.

Dr. WENDELL C. PHILLIPS: At the present time I do not feel inclined to discuss the treatment employed for the relief of this condition, but I rise to ask a few questions. At the same time I should like to call attention to one fact. The cases that

Dr. Brandegee reported were people who had constant vertigo, and not intermittent vertigo, and it strikes me that this is an exceedingly rare class of cases. It is more common to have present occasional vertigo. I should like to ask if all the cases had constant vertigo; also, if he has made any effort to relieve cases of Ménière's disease by this method of treatment. One might get the impression that all cases of vertigo are associated with stricture of the Eustachian tube; this, of course, is not true, for there must be a class of patients with vertigo who have no stricture of the Eustachian tube. I have such a case under my care, but it is not one of constant vertigo. She occasionally is compelled to give up her work and go to bed. In this case the Eustachian tubes have been repeatedly examined, by means of the otoscope, and found to be patulous. She also has a chronic catarrhal otitis media.

Dr. JOSEPH A. KENEFICK: It seems to me that we cannot consider one symptom without considering the other. Cases of vertigo presenting themselves at the Eye and Ear Infirmary have been usually associated with tinnitus, and it has been my experience that, after the tympanum has been ventilated, the vertigo and tinnitus have disappeared. It seems to me that the great majority of these cases of vertigo and tinnitus might be classed under two headings: (1) Those which are dependent upon primary intralabyrinthine pressure, caused by obstruction within the Eustachian tube, and (2) those caused by contraction of the tensor tympani or of inflammatory bands within the tympanum. It is therefore evident that by restoring the patency of the Eustachian tube, and destroying these bands if they can be reached, these symptoms ought to be greatly relieved. I have had the pleasure of following the cases with Dr. Brandegee, and the relief obtained by some of the patients is considered by them little short of miraculous.

In regard to the method of reducing intralabyrinthian pressure by opening the Eustachian tube, I can only add my testimony, and say that I know of no method by which organized obstructions can be removed more easily than by the method of Dr. Duel.

Dr. ARTHUR B. DUEL: I can subscribe most heartily to the statements that have been made by the previous speakers. Dr. Kenefick has just covered the ground in regard to the class of cases of tinnitus and vertigo which can be relieved by electrolysis of

the Eustachian tube. I do not see how it would be possible to relieve a case of *true* Ménière's disease by the use of electrolysis in the Eustachian tube or tympanum.

I wish to call attention to the careful technique that Dr. Brandegee has adopted in doing this work, and to insist upon it that all others should follow it as carefully, if they hope for good results. Since I read a paper on this subject, three years ago, otologists throughout the country have employed this method of treatment, and some have reported failures which I am certain in many instances were due to changes introduced. I insist that the technique should be carefully followed, if good results are to be expected.

Dr. JAS. F. MCKERNON : I should like to add a word in regard to those cases where the vertigo is not constant. During the past three years I have had cases under observation in which the tube was open and nothing seemed to be wrong. I speak of this because in the treatment I employed that which was not mechanical but therapeutical. There seemed to be something in these cases from a hereditary standpoint, a rheumatic or gouty tendency, and so salicylates and colchicum were used. Where the vertigo was not constant, after the administration of these remedies for a period of six weeks, there was marked improvement. These cases were eight in number, six of whom I have recently heard from ; they have been out from under observation for seven months and there has been no recurrence of the vertigo. In some cases where the tube is not wide open these drugs help. One case I remember in particular was a man fifty-four years old, with the tube markedly stenosed. He had been under the care of a prominent neurologist of this city, and later was in an asylum, committed as an insane person. It was said that he was not insane, but he was placed there because he could not be kept quiet. He was subject to vertigo and pitched forward all the time. Members of his family succeeded in getting the man out of the insane asylum and the neurologist brought him to me. I found that the Eustachian tube was markedly contracted its entire length. It took me four sittings of ten minutes each to get through into the middle ear. The negative pole was used in the tube. There has been no vertigo since, and he was under observation for a period of six weeks. I have not used this method on him for over a year now. He has been under strict observation ; the last time I saw him was about three weeks ago, when the tube

was patent. In another case, where the Eustachian tube was tight, there were recurrent attacks of vertigo from time to time.

Dr. BRANDEGEE: I have never used this method in treating primary involvement of the labyrinth; I have treated only secondary affections of the labyrinth due to middle-ear changes. In all the cases the vertigo was not constant. In eight of them it was constant; in six of them it was not. I have never used this method of treatment in Ménière's disease at all.

I did not intend to convey the impression that all vertigo cases were due to strictures of the Eustachian tube; but, in all the cases that were reported, vertigo was connected with stenosis of the tube. It was proven that all cases were cured by restoring the patency of the Eustachian tube. It seems to me a curious fact that more men do not follow this method of treatment. I hear men saying they were doing this and doing that, and I do not wonder that they do not get the same results as Dr. Duel; they should follow the technique as laid down and follow it accurately, if they wish for success. As I stated in my paper, the results astonished the patients, and they were certainly astonishing to me. It certainly was striking that such results could be obtained, such marked relief, especially when the symptoms had extended over so many years.

REPORT ON THE TRANSACTIONS OF THE OTOLOGICAL SOCIETY OF THE UNITED KINGDOM.

MEETING MONDAY MARCH 4, 1901.

By Mr. A. H. CHEATLE.

THE PRESIDENT, SIR WILLIAM B. DALBY, IN THE CHAIR.

The following patients were shown and the following communications made.

Mr. Cheatle showed a patient upon whom he had performed the **complete post-aural operation.** The whole antro-tympanic cavity had become lined by a dry, glistening epithelium, and he wished to ask how such an epithelial lining differed from the lining membrane of a cholesteatomatous cavity.

Mr. Urban Pritchard said that in the one case the epithelium was derived from skin, in the others from mucous membrane.

Dr. Dundas Grant urged the advisability of leaving the lining membrane of a cholesteatoma in certain cases.

Mr. Ballance said that in the ordinary form of cholesteatoma there was no lining membrane at all, and that the appearance of a membrane was simply due to the flattening from pressure of the cells forming the cholesteatoma. He strongly deprecated leaving any portion of the cholesteatoma behind.

Mr. Fagge showed a patient with a **closed meatus** and with **facial paralysis** as a result of a Mauser bullet wound, and asked whether the meatus should be opened up, considering that the middle ear appeared to be intact.

Mr. Cheatle thought that the meatal stenosis should be removed.

Dr. Law doubted whether in this case the middle ear was intact, and did not consider that the patient would derive any benefit from operation.

Dr. MILLIGAN thought that the cicatricial stenosis should be dissected out and a portion of the bony meatus removed at the same time to try to obviate recontraction.

Mr. DE SANTI considered operation inadvisable, as also did Dr. LAMBERT LACK.

Dr. MACNAUGHTON JONES considered no danger was to be anticipated in attaching the cicatricial band.

Mr. PRITCHARD said that he was inclined to leave things as they were.

Mr. BALLANCE advocated removal of the scar and union of the cut ends of the facial nerve, which was evidently divided outside the stylo-mastoid foramen.

Dr. DUNDAS GRANT showed some teaching diagrams for the explanation of Weber's and Rinne's tests.

Mr. R. LAKE showed the following specimens: (1) **absence of tendon of tensor tympani**; (2) **pigmented warty growth from the auricle** of a female aged fifty years; (3) **caries necrotica of the outer antral wall** from a child aged four years.

Dr. ST. CLAIR THOMSON showed a **foreign body which had remained innocuously in the meatus for twenty-six years.**

Dr. MACNAUGHTON JONES referred to a case where a grain of shot had remained in the ear for seventeen years.

Mr. CHEATLE referred to the advisability of removing all foreign bodies under antiseptic precautions.

Dr. MILLIGAN said that it was very desirable that there should be no undue haste in removing foreign bodies unless urgent inflammatory symptoms were present.

Dr. PRITCHARD referred to a case where a cherry-stone had been in the ear for fifty years.

Dr. H. JONES read the notes of a case of **temporo-sphenoidal abscess in which operation had been followed by recovery** and showed a specimen and microscopical sections from **a child aged two years who died in convulsions twenty-four hours after the ordinary mastoid operation.**

The cases were discussed by Mr. Cheatle, Mr. Lake, and Dr. Milligan.

REPORT ON THE PROGRESS IN OTOLOGY DURING THE THIRD QUARTER OF 1900.

(Concluded from page 176.)

By Dr. ARTHUR HARTMANN.

Translated by Dr. Arnold Knapp.

NOSE AND NASO-PHARYNX.

a.—METHODS OF EXAMINATION AND TREATMENT.

237. **Rethi.** External rhinoscopy. *Monatschr. f. Ohrenhlk.*, No. 5, 1900.

238. **Stein.** Examination of nasal function. *Hospitalstidende*, Nos. 41–43, 1900.

239. **Neumann.** The nasal douche. *Bolnitschkaja Gaseta Botkina*, No. 12, 1900.

240. **Lermoyez** and **Mahu.** Hot air in the treatment of the upper respiratory passages. *La presse médicale*, No. 59, 1900.

241. **Lermoyez** and **Mahu.** A new method of treating nasal affections with hot air. *Ann. des malad. de l'or., du lar.*, xxvi., 7.

242. **Hoffa.** Operations on the nose. *Arch. f. Laryng.*, x., 3.

237. Rethi described Bergeat's method of external rhinoscopy in 1892. Killian.

238. Stein has experimented with the olfactometric technique of Zwaardemaker and describes several olfactory standards and gauges. Stein.

239. Owing to the danger of all methods of nasal irrigation, Neumann recommends pouring a 20 % solution of menthol in liquid paraffine in the nose to cleanse the latter and the naso-pharynx; adults receive 5 to 10 drops, children 1 to 5 drops in each nostril, while the head is held back. If the nose is occluded, pledgets of gauze soaked in this solution are inserted for 15 to 20 minutes. Sacher.

240–41. Dry warm air of 70° to 90° C. is applied by a particular apparatus to the affected part of the nose or naso-pharynx under rhinoscopic guidance. The temperature and pressure can be regulated. Sittings of 2 to 4 minutes' duration are held every other or third day. The opening of the canula should always be 2 to 3 *mm* distant from the mucous membrane, though care must be taken not to cause burning. After the treatment the patient should keep to the room for a half-hour. The treatment is indicated in all forms of vasomotor rhinitis, in the simple chronic catarrh, the subacute catarrh of the Eustachian tube, and in reflex otalgia from nasal catarrh. It should be tried in hay fever. In chronic middle-ear sclerosis and ozæna it proved to be unavailing.

SCHWENDT.

242. HOFFA describes three cases where he had successfully removed protuberances on the nose by subperiosteal resection of the bone and cartilage; a saddle-shaped deformity of syphilitic origin, by an osteoperiosteal flap from the tibia; finally a case of adhesion between the lower turbinal and the septum in a patient suffering from a severe neuralgia, where the neuralgia was also relieved by the operation. ZARNIKO.

b.—GENERAL SYMPTOMATOLOGY AND PATHOLOGY.

243. **Kafemann.** Psychologic investigation of the so-called nasal aprosexia. *Arch. f. Laryng.*, vol. x., 3.

244. **Alkan.** Certain varieties of hard palate and their origin. *Arch. f. Laryng.*, x., 3.

245. **Muck.** On the presence of rhodan in nasal and conjunctival secretions. *Münch. med. Wochenschr.*, No. 34, 1900.

246. **Bliss, Arthur Ames.** Severe hemorrhages after operations on the throat and nose. Report of five cases. *N. Y. Med. Jour.*, Sept. 8, 1900, and *Amer. Laryngol. Association.*

247. **Hopkins, Fred. E.** Secondary hemorrhage, following the use of suprarenal extract. *N. Y. Med. Jour.*, Aug. 25, 1900, and *Amer. Lar. Ass.*

248. **Jones, Noble W.** The presence of virulent tubercle bacilli in the healthy nasal cavity of healthy persons. *N. Y. Med. Record*, Aug. 25, 1900.

243. KAFEMANN has attempted to investigate in Kraepelin's psychological laboratory whether or no it be possible to influence the mental activity in a healthy individual by impeding nasal respiration. It seems from his results that this is possible. Unfortunately the article is vague and the technical terms unintelligible to one not a psychologist. ZARNIKO.

244. ALKAN comes to the following conclusions: 1. The hard

palate of the new bone is very short. With increasing years the height and breadth enlarge slowly, while the length increases relatively rapidly. 2. In people with adenoid vegetations the palate is regularly high, long, and narrow. 3. The configuration of the hard palate does not correspond to the shape of the skull. 4. Anomalies of position of teeth are frequently met in abnormal maxillary and palatal formations and may be the results of the latter.

ZARNIKO.

245. When rhodan was detected in the saliva, it was present also in the nasal secretion. Its presence in the conjunctiva could also be determined. MUCK believes that the bactericidal quality of the nasal secretion was invested in rhodan. SCHEIBE.

246. Cases 1 and 4, adults, were operated for septal displacement and papilloma of the lower turbinate respectively, and controlled by plugging. Cases 2 and 3 were hemorrhages from tonsillotomies in a boy æt. two and a woman æt. thirty-one, respectively, controlled with hemostatics. Case 5. Anæmic boy, æt. seven, mouth-breather, had enormous adenoids and extreme deflection of septum to the left. The brother, cousin, and uncle on the mother's side were bleeders, as it was found out after operation, which was an Allen's supralabial resection for deviated septum, and an excision of adenoids. During the following night there must have been considerable oozing of blood. On the next morning, an alarming bleeding from nose and naso-pharynx was controlled by packing. The death of the exsanguinated child ensued after four days, in spite of ergot, strychnine, and transfusion. The patient had formerly suffered from swellings of the joints and extensive ecchymoses following contusions. M. TOEPLITZ.

247. In considerable proportion of operated cases, hemorrhages occurred at intervals of from 2 to 6 hours after operation, and was more frequent when the suprarenal extract was used in combination with cocaine than when cocaine alone was applied, and was more marked in operations on the turbinates than on those of the septum. A number of laryngologists confirmed the occurrence of secondary hemorrhages, except those who pack after operations. Suprarenal extract alone seems beneficial in acute cases, with a few exceptions as idiosyncrasies, while, when used with cocaine, there is too much secondary relaxation.

M. TOPELITZ.

248. JONES tried to answer the following questions — 1. Are

tubercle bacilli to be found in the nasal cavities of healthy individuals following the ordinary vocations of life? 2. Are they to be found in larger proportions in those more or less intimately connected with the tuberculous?—by the following experiments: He removed the entire contents of the nasal cavities of men in good physical health by means of sterilized cotton swabs, which were washed in test tubes containing 10 *ccm* of sterilized normal salt solution, and inoculated with these thirty-one animals. The results are briefly tabulated. Three out of twenty-nine developed tuberculosis. Jones answers the first question affirmatively, and the second by stating that the tubercle bacilli are not as frequent in these persons as in those who have the care of the tuberculous.

M. TOEPLITZ.

c.—OZÆNA.

249. **Farlow, John W.** A case of ozæna of probably sphenoidal origin. *N. Y. Med. Journ.*, Sept. 29, 1900, and *Amer. Laryng. Assoc.*

250. **Logan, James E.** Atrophic rhinitis. *N. Y. Med. Journ.*, Sept. 1, 1900, and *Amer. Laryng. Assoc.*

249. A female patient, aged twenty-one, had offensive crusts in the left nostril with the inferior turbinal shrunken, and the mucous membrane atrophied. The probe was pushed into the sphenoidal sinus, which was then washed out, whereupon odor and crusts disappeared. Occasional probing, curetting, and washing of the sinus keep the nose in good condition.

M. TOEPLITZ.

250. In discussing the different theories on causation of atrophic rhinitis—(1) hypertrophic rhinitis as initial lesion; (2) suppurative rhinitis in childhood; (3) specific germs; and (4) preexisting suppuration of accessory sinuses—LOGAN rejects the first three. However, he believes that the middle turbinated body is more inclined to atrophy, due to suppurative ethmoiditis. He illustrates this view by three cases, which were greatly benefited and cured respectively by the removal of the middle turbinal followed by opening of the anterior, and, if necessary, of the posterior ethmoid cells with subsequent curettement.

M. TOEPLITZ.

d.—NEW GROWTHS.

251. **Barrago-Ciarella.** On the not unusual presence of blastomycetes in nasal polypi. *Arch. f. Laryng.*, x., 3.

252. **Lombard.** Clinical cases. Three cases of mucous polyps of the choanæ. *Ann. des. mal. de l'or., du lar.*, xxvi., 5.

253. **Parker, C. A.** A case of radical operation for nasal polypi. *Proc. Laryng. Soc.*, London, June 1, 1900.

251. BARRAGO-CIARELLA has stained sections of nasal polypi hardened in Müller's fluid or alcohol after the method of Sanfelice and Aievolli, and discovered peculiar-looking structures which he regards as blastomycetes, and of some etiological significance.
ZARNIKO.

252. LOMBARD describes three cases where the polyp twice arose from the choanal margin, and once from the posterior end of the middle turbinal. The polyps were grasped by the loop of a cold snare introduced through the nose, and the finger in the naso-pharynx serving as a guide. ZIMMERMANN.

253. A man aged thirty years had had several previous operations for polypi, and returned in as bad a condition as ever. Under a general anæsthetic, the polypi, middle turbinate, and the ethmoidal cells were all thoroughly removed in the manner advocated by Lambert Lack. The result was excellent.
ARTHUR H. CHEATLE.

c.—SEPTUM.

254. **Killian.** A case of acute perichondritis and periostitis of the septum of dental origin. *Münch. medic. Wochenschr.*, No. 6, 1900.

255. **Krieg.** The operation of window resection of the septum for scoliosis septi. *Arch. f. Laryng.*, vol. x., 3.

256. **Loewe.** The surgery of the nasal septum and the upper accessory cavities of the nose. *Monatschr. f. Ohrenhlk.*, No. 7, 1900.

254. In KILLIAN'S case after two days of toothache the nose became occluded, with fever up to 40°. On the seventh day escape of a large amount of fetid pus. On examination, the mucous membrane over the entire septum was bulging. A large part of the cartilaginous septum was destroyed by the inflammatory process. A probe could be passed near to the lamina cribrosa, posteriorly to the vomer; the entire septal mucous membrane was elevated. Recovery took place after treatment with gauze tampons soaked in alum. acetat. solution. A half year later a cyst filled with pus, touching the floor and septum of the nose, was found connected with the root of the diseased tooth. This was healed by removing the anterior wall. HARTMANN.

255. A summary report of 130 window resections. Perforations of the septum rarely follow. The operation is a very difficult one, but should be studied and practised as long as there is none better. ZARNIKO.

256. LOEWE recommends for a submucous resection of the bent and thickened cartilage to operate through the mouth after

detaching and raising the skin of the face to the lower orbital margins. The severity of this procedure for simply a deviated septum seems out of proportion and unjustified. KILLIAN.

f.—ACCESSORY CAVITIES.

257. **Killian.** The diseases of the accessory cavities of the nose. Reprint from the *Handbuch der Laryngologie und Rhinologie.*

258. **Ziem.** On the etiology and treatment of purulent diseases of the nose and its accessory cavities; the importance of the ductus and hygroma. *Monatschr. f. Ohrenheilk.*, No. 9, 1900.

259. **Stanculeanu** and **Raup.** Bacteriology of empyemas of the accessory cavities. *Arch. internat. de laryng., d'otol.*, etc., vol. xiii., No. 3.

260. **Lubet-Barbon** and **Furet.** On the diagnosis of maxillary empyema with gumma of the antrum. *Arch. internat. de laryng., d'otol*, etc., vol. xiii., No. 3.

261. **Lack, Lambert.** Case of a male aged twenty years, with distension of the maxillary antrum. *Proc. Laryng. Soc.*, London, June 1, 1900.

262. **Tilley, Herbert.** Chronic empyema of the frontal sinus with notes on the treatment of fourteen cases. *Lancet*, July 14, 1900.

263. **Denker.** Rhinogenous abscess of the frontal lobe and extradural abscess in the forehead, healed by operation. *Arch. f. Laryng.*, x., 3.

264. **Botesat.** Trephining of the frontal sinus for empyema. *Wojenno-medizinski Shurnal*, March, 1900.

265. **Zimmermann.** An osteoma of the frontal sinus. *Deutsche Zeitschr. f. Chir.*, Nos. 3 and 4, 1900.

266. **Mentow.** A case of cutaneous emphysema after traumatism to the frontal sinus. *Eshenedelnik.*, No. 24, 1900.

267. **Souza, Valladarez.** Two cases of empyema of the left sphenoidal sinus. *Ann. des malad. de l'or., du lar.*, xxvi., 9.

257. KILLIAN gives a complete exposition of the diseases of the nasal cavities and of the frontal sinus, including the anterior ethmoid cells. In the historical introduction it is stated that the maxillary and frontal sinus were first taken notice of and the treatment was done by general surgeons. The knowledge of ethmoid- and sphenoid-sinus disease is due entirely to rhinologists.

Among the various foreign bodies observed in the sinuses, animal and also vegetable parasites are observed. An operative treatment is necessary if a sinusitis is present. As non-inflammatory process exudates occur in cavities following general dropsy from contracted kidney or cirrhosis of the liver, pus may gain the antrum of Highmore. In these cases extraction of a tooth and a few irrigations may result in a cure.

The author separates from the chronic sinusitis a sinusitis cum dilatatione and a sinusitis exulcerans atque abscedens, of which the first results from pressure in closed ostia, and the last is similar to

the cases of acute inflammation dependent on severe virulence of the micro-organisms. These two varieties can of course be associated, as in a case of the author's where the anterior bony wall of a much dilated cavity was replaced by a granulating and ulcerated soft surface.

In the radical operation of the frontal sinus Killian recommends the osteoplastic resection of the anterior wall if the sinus is very large, otherwise he prefers to resect the anterior and lower walls, leaving the orbital margin to prevent disfiguring sinking in. The temporary resection of the nasal bone permits access to the anterior ethmoid cells and makes a broad communication with the nose possible.

In the thirty cases of intracranial processes in chronic frontal sinusitis, changes in the cerebral wall were found in twenty-five. The author has recently published a case where this wall was found macroscopically normal in presence of an abscess in the frontal lobe. Luc's advice to puncture the brain to a depth of 4 *cm* in suspected abscess is unjustified, as in the author's measurements the anterior horn was found only 2.7 *cm* from the surface.

The diagnosis of primary carcinoma of the maxillary antrum has not been sharply defined. Anæsthesias in the peripheric branches of the infraorbital nerve, caused by pressure of the tumor, are characteristic; diagnostic puncture is negative, while transillumination is positive; partial or total change in the shape of the superior maxilla must be considered. In brief, this subject is treated in a most careful and painstaking way and can be recommended to any one desirous of becoming thoroughly acquainted with the subject or its literature. DENKER.

258. ZIEM describes the factors which are of injurious influence to the condition of the nose and its accessory cavities: 1 Overlooked diseases of the teeth and upper jaw. 2. Badly ventilated rooms and impure air. 3. Tobacco and alcohol. 4. Taking cold, especially in the head. KILLIAN.

259. Seventeen empyemata of the maxillary and frontal sinuses were examined bacteriologically. In empyema due to carious teeth, the bacillus ramosus, perfringens, and serpens are frequently present and belong to the anaërobic species. The pus in these cases is fetid. In the empyema of nasal origin the pus is not fetid; pneumococci and streptococci are frequent. Exceptionally the bacillus perfringens is present. Animal experiments proved the virulence of all of these micro-organisms.

SCHWENDT.

260. In the simple empyema of the maxillary antrum the suppuration is profuse ; pus is evacuated from time to time as the cavity becomes over-filled. The fetor is noticeable to the patient himself. Granulations are found on the walls of the antrum. A complicating ethmoiditis gives rise to nasal polypi and occasionally to small sequestra. The bony wall itself is unaffected. In the gumma of the sinus wall the antrum is obliterated with granulations ; the bony wall becomes eroded in places with perforations into the nose and nasal pharynx. The pus is cheesy, inspissated, and discharges constantly. The fetor is not noticeable. The nose is obstructed by a hard swelling of the turbinals and walls irreducible by cocaine ; the external surface of the nose is frequently swollen and tender. SCHWENDT.

261. The upper wall of the left antrum was pushed upwards and the inner was bulging into the nose, causing partial obstruction. To transillumination the left antrum was equally translucent with the right. On puncture no pus was found, but on making a large opening through the canine fossa the cavity was found full of ordinary polypi. ARTHUR H. CHEATLE.

262. This is a most instructive paper and represents the latest method adopted in England for the treatment of frontal sinus suppuration. The whole paper should be studied.

A noteworthy addition has been made by TILLEY. In three cases, after the paper was written, he has successfully grafted the cavity by Thiersch's method. ARTHUR H. CHEATLE.

263. DENKER's patient was seventeen years old and complained of pains in the left frontal region and eye, with fetid discharge from the nose. Rhinoscopically suppurations of the anterior ethmoid cells and of the frontal sinus were found. Endonasal treatment proved unavailing and the external operation was resorted to. In the second week after the operation the condition grew worse ; apathy, stupor, slow pulse, involuntary discharge of the urine and fæces ; temperature rose to 39°. Second operation on the fifteenth day ; the posterior wall of the frontal sinus was opened and an extradural abscess discovered. The dura was incised and aspiratory puncture detected an abscess in the frontal lobe filled with fetid pus which was evacuated. To reduce the prolapse a plastic was performed on the eighteenth day. Recovery took place and has now been healed for six years. In his remarks the author discusses the symptoms, operative technique,

and functional result. The case is the first rhinogenous brain abscess cured by an operation. ZARNIKO.

264. BOTESAT'S case is peculiar because though the anterior bony wall was destroyed the pus was not able to gain an external opening on account of the thickened periosteum. Recovery after trephining. SACHER.

265. A waiter, seventeen years of age, was taken ill with acute symptoms of a frontal sinus suppuration, two and one-half years after an injury on the head. A gradually progressive swelling of the left frontal area had been disregarded. The left eye was closed, the eyeball was prominent and displaced down, retinal congestion and diplopia. The region of the eyebrow was uneven and thickened. The operation revealed an osteoma which had perforated the sinus walls toward the brain, eye, and nose, and had originated at the juncture of the frontal and ethmoid bone in the floor of the sinus. An acute sinusitis was also present. The osteoma was composed of cancellous bone with a firm shell, but there was no cartilage. ZIMMERMANN believes it to be of periosteal origin, and due to a traumatic interruption of the development of the frontal sinus. BRÜHL.

266. MENTOW'S patient struck his forehead against a rafter. On the following day he complained of severe dyspnœa, dysphagia, pain in the right half of the neck and supraclavicular groove. A doughy swelling occupied the right half of the neck, giving tympanitic resonance on percussion and distinct crepitation on palpation. The anterior wall of the frontal sinus was fractured. All symptoms disappeared after two weeks. The absence of emphysema in the face was remarkable. SACHER.

267. The first case was that of a man aged forty, who had suffered from intermittent fetid discharge from the left nostril since childhood. The second was a man, thirty years old, who woke up in the morning with the sensation of a foreign body in the throat, which disappeared after blowing his nose and evacuating crusts and pus. Objectively there was pharyngitis sicca, and pus on the median side of the middle turbinate. Healing occurred after enlarging the opening into the sphenoid sinus and curetting.

ZIMMERMANN.

g.—OTHER DISEASES.

266. **Wolff, D.** Fibrinous or pseudo-membranous rhinitis. *Dissertation*, Leipzig, 1899.

267. **Peltesohn.** The treatment of fibrinous rhinitis. *Therapeutische Monatshefte*, Sept., 1900.

268. **Moliné.** Nasal hydrorrhœa. *Arch. internat de laryng., d'otol.*, etc., vol. xiii., No. 3.

269 **Cozzolino.** On the importance of free nasal respiration in the treatment of consumption. *Monatschr. f. Ohrenhlk.*, No. 6, 1900.

270. **Baup.** Latent tuberculosis of the three tonsils. *Ann. des mal. de l'or., du lar.*, xxvi., 5.

271. **Gerber.** On scleroma, especially in East Prussia. *Arch. f. Laryng.*, x., 3.

272. **Baurowitz.** On scleroma; a study of one hundred cases. *Arch. f. Laryng.*, x., 3.

273. **Buck, Louis.** Hæmophilia in the negro. *N. Y. Med. Rec.*, July 28, 1900.

274. **Holmes, Christian R.** Hypertrophy of the turbinated bodies. *N. Y. Med. Jour.*, Sept. 29, 1900.

275. **Curtis, H. Holbrook.** The immunizing cure of hay fever. *Med. News*, July 7, 1900.

266. In WOLFF'S dissertation the literature on fibrinous rhinitis has been thoroughly compiled; in addition, four cases are described. In all, true diphtheria bacilli were found, but fever and general symptoms were absent. The treatment with iodoform insufflations appears to have been quite satisfactory.

HARTMANN.

267. PELTESOHN has been able in twelve cases to rapidly free the nose of membranes and to remove the nasal obstruction by the application of a cyanide of mercury solution 0.02 : 50.0.

HARTMANN.

268. Hydrorrhœa nasalis frequently accompanies other affections. MOLINÉ describes that variety where the hydrorrhœa is the principal symptom, a profuse constant discharge without any irritating cause or pain. In one case the secretion was quite different from the lymph usually found; reaction was acid, no albumen, but much mucin. Hence there appear to be two varieties of hydrorrhœa. SCHWENDT.

269. COZZOLINO writes of the importance of free nasal respiration in the treatment of consumptives. KILLIAN.

270. BAUP examined forty-eight faucial and pharyngeal tonsils. Aside from the various pathological changes found present in the epithelium and connective tissue, evidence of tuberculosis was present in only one, in the pharyngeal tonsil of a boy aged fourteen. Tubercle bacilli in groups of two and three were found in a number of sections in an area of greater

infiltration of connective tissue, which the author regards as an expression of a reactive-curative process. Inoculations proved the tuberculous nature. The significance of these cases of hidden tonsillar tuberculosis is important in the causation and in other localizations of tuberculosis. ZIMMERMANN.

271. GERBER gives ten complete case-histories. In one case typical rhinoscleroma was combined with carcinoma. The others showed the following peculiarities: external changes in nose were wanting in all, internally the conditions were normal in two, ozæna was present in three, hyperplastic rhinitis in one, and scleromatous changes in the rest. The septum was always thickened posteriorly, narrowing the choanæ. Naso-pharynx was normal. In three cases the larynx showed subglottic stenosis, in the others subglottic hypertrophies. Of nine cases, five came from Russia, five from East Prussia. The author thinks that his cases belong to a special subdivision, as the virus was attenuated and symptoms correspondingly mild. ZARNIKO.

272. BAUROWITZ gives a detailed description of the history, peculiarities, pathology, and site of scleroma. One hundred case-histories are added, and finally a review of the cases is given according to the location in the respiratory tract, clinical appearances, and therapeutic rules. ZARNIKO.

273. BUCK reports two cases of severe nasal hemorrhage in a colored man, thirty years old, and in a colored woman, twenty-seven years old, in whom suprarenal extract with plugging was tried with but temporary success; the bleeding was finally controlled by calcium chloride internally, combined with anterior and posterior plugging. M. TOPELITZ.

274. After a careful description of the pathological changes of the turbinated bodies, HOLMES asserts that, when the second stage of hypertrophy is reached, a cure is effected only by surgical interference. His observations are based upon 1500 operations in private practice. The use of caustics and galvanocautery is now abandoned, small saws and curved alligator scissors are used instead, in order to produce a bone scar. He removes almost the entire lower turbinal, leaving a small piece at the anterior end intact, but he includes the posterior end. Holmes operates these cases in the hospital and enforces rest upon the patient for a few days after operation. M. TOEPLITZ.

275. Violent attacks of neurotic coryza brought about by any

exposure to perfume of flowers were combated in a woman, æt. thirty-five, by immunizing her with the watery extract of roses, violets, lilies of the valley, and their pollens, given internally and hypodermically.

Another patient working in the ipecac department of a drug store was seized with neurotic coryza and could return there only by taking some tincture or syrup in drop doses for several days.

The administration of the causative drug, also, in goldenrod and ragweed coryza, lessens the coryza. The tincture and fluid extract of ragweed, which as the recognized king of pollens produces hay fever, administered in two- to ten-drop doses t. i. d. in water during the two weeks preceding the paroxysm, ought to be tried.

M. TOEPLITZ.

h.—NASO-PHARYNX.

276. **Goldschmidt.** The influence of removal of adenoid vegetations on diseases which are caused by them. *Wien. klin. Wochenschr.*, No. 35, 1900.

277. **Pollatschek.** Clinical cases from the Dispensary for Children in Prague. *Prag. med. Wochenschr.*, No. 43, 1900.

276. GOLDSMITH has collected from literature the sequelæ of adenoid vegetations and how they are influenced by the removal of the latter. POLLAK.

277. POLLATSCHEK relates the results obtained by feeding thymus gland in tonsillar hypertrophy and in spasm of the glottis. Six children were experimented on without result.

HARTMANN.

SOFT PALATE, PHARYNX, AND MOUTH.

278. **L'Abbe** and **Sirugue Lévy.** Structure and physiology of the faucial tonsil. *La presse médicale*, Aug. 3, 1900.

279. **Harmer.** Examination of the membrane occurring on the tonsils after tonsillotomy, and its relation to diphtheria bacillus. *Wien. med. Wochenschr.*, No. 38, 1900.

280. **Tarassewitch.** A case of angina with fusiform bacteria and spirilla. *Russkij Archiv Patologii*, etc., Nov., 1899.

281. **Speranski.** A case of necrotic angina caused by Vincent's fusiform bacteria. *Djetskaza Medizina*, May–June, 1900.

282. **Lombard** and **Caboche.** Two cases of peripharyngeal abscesses. *Ann. des mal. de l'or., du lar.*, xxvi., 5.

283. **Ssyssin.** Sublingual colloid cysts. *Wojenno medizinski Shurnal*, Feb., 1900.

278. In the interior of the follicles lymphocytes are formed, which became converted into mononuclear leucocytes and eosinophile cells. These find their way into the lymph vessels; several

leucocytes appear on the surface of the mucous membrane. The leucocytes serve as protectors against micro-organisms and toxines from their phagocytic properties and their antitoxic actions. In the tonsillar crypts of healthy individuals, pneumococci, streptococci, stapylococci, and tubercle bacilli can be found. The crypts act as filters which prevent the entrance of malignant organisms. If the tonsils are so large as to interfere with respiration they no longer fulfil their function. SCHWENDT.

279. HARMER examined the membranous deposit found after tonsillotomy and found bacteria present only in the membrane; the adenoid tissue was infiltrated with round cells. The pyogenic bacteria were the streptococcus and staphylococcus but never the diphtheria bacillus. POLLAK.

280. During a diphtheria epidemic TARASSEWITCH observed a case of angina with a few follicles in a child of six years. Temp. 38.4°. Pulse 126. Recovery in ten days. Repeated microscopic examinations showed a large quantity of Vincent's bacilli and spirilla which could not be stained according to Gram.

SACHER.

281. A child, aged nine, was taken ill with tonsillitis. Both tonsils and the soft palate were red and swollen. The right tonsil was covered with a dirty gray deposit. General condition good; no fever. Bacteriologic examination revealed numerous fusiform bacilli and spirilla and a small number of other micro-organisms. There were no diphtheria bacilli. SACHER.

282. A short report of two rapidly fatal cases of peripharyngeal phlegmons with septic intoxication. ZIMMERMANN.

283. In SSYSSIN's case the tumor was as large as a hen's egg, occupied the entire floor of the mouth, and pushed up the tongue. Healing took place after enucleation of the cyst and repeated cauterizations of the cavity. The opening of Wharton's duct was found perfectly patent at the operation. SACHER.

BOOK NOTICE.

Lehrbuch der Ohrenheilkunde für Aerzte u. Studirende.

III.—By Dr. ADAM POLITZER, Professor of Otology at the University of Vienna. Fourth, totally revised edition ; 710 pages of large octavo, with 346 text illustrations.

Politzer's work maintains its place as the international leading otological text-book, not so much for its adaptation to the undergraduate student, for whom, in our opinion, smaller compendia would be more suitable, but for the advanced student of otology, and for the general practitioner to familiarize himself intelligently and earnestly with the diagnosis and treatment of the many and important ear diseases which, from year to year, come before him with increased frequency and greater responsibility. The third (German) edition, appearing in 1893, had 619 pages. In perusing the fourth edition we notice no essential changes in the first 103 pages, anatomy, physiology, and the methods of examination of the ear. The latter, presented with all the detail permissible in a text-book, have received some additions. Among them is the beautiful method of Gradenigo to determine the duration of vibration of a tuning-fork with the sense of sight for the deeper sounds (below 60 double vibrations). A black triangle on white paper is pasted on the ends of the prongs of the fork. The double images, which at first are far apart, gradually approach each other, and form only one black triangle when the fork has ceased to vibrate (see Trans. VI. Internat. Otol. Congress at London, 1899).

Gradenigo proposed at the London Congress the following abbreviations which were adopted by the Italian Otological Society and are now in more or less general use, viz. : W = Weber's experiment ; R = Rinne's exp.; S = Schwabach's exp. (duration of vibration) ; v = vox, voice ; vc = voice of conversation ; va = vox aphona, whispering ; aP = acoumeter of Politzer ; h = watch ; ad = right ear ; as = left ear.

In speaking of attenuation and compression of air in the external ear-canal, the author endorses the use of an electromotor massage instrument according to Breitung, and says that the hearing is not so much improved, but the subjective symptoms, tinnitus, dizziness, and stupor, are often greatly relieved; yet in certain cases they and the deafness are aggravated. Pneumomassage is contraindicated in all acute inflammations.

As regards the notation of the pitch of sounds by letters the reviewer cannot see why Politzer gives the following scale:

$C^{-2} = 32$ dv; $C^{-1} = 64$ dv; then $c = 128$; $c' = 256$, etc.

The reviewer is accustomed to use the scale of Helmholtz (*Tonempfindungen*, 1st and 2d editions, p. 30): $C^{-2} = 16$ dv; $C^{-1} = 32$; $C = 64$; $c = 128$; c' or $c^1 = 256$; c'' or $c^2 = 512$, etc.

In German and frequently in English literature, the octaves are called as follows:

Subcontra octave,	C^{-2}	beginning with	16 dv.
Contra octave,	C^{-1}	" "	32 "
Large octave,	C	" "	64 "
Unmarked or small octave,	c	" "	128 "
Once marked octave,	c′ or c^1	" "	256 "
Twice " "	c″ or c^2	" "	512 "

c^3 beginning with 1024; c^4 beginning with 2048; c^5 beginning with 4096, etc.

There is a small difference found in all these determinations. Helmholtz puts down C beginning with 66, etc., but the above numbers are the more usual.

The different methods of examining the auditory function are treated in a very clear manner, sufficient to furnish the basis and working material for a systematic, scientific, and practical examination in any case.

The diseases of the drum membrane, profusely illustrated by the author's practice and pathological investigations, are interesting and useful reading, giving also detailed and judicious rules of treatment. The remarks on acute and chronic diseases of the tympanic cavity, the Eustachian tube, and the mastoid process, p. 217, are very important, especially in a prophylactic way; the early recognition, appreciation, and treatment of these affections ward off chronic inflammatory annoyances with impairment of hearing and the dreaded deeper complications from neglect of early care. Paracentesis of the *Mt*, division of the posterior folds, and tenotomy of the tensor tympani are described.

Otosclerosis, so frequent, distressing, and little amenable to treatment, receives 12 pages, which are distinguished by the author's important pathological investigations on the primary affections of the labyrinth capsule, osseous ankylosis of the stapes, etc. The unsatisfactory results of the manifold attempts of treatment are critically discussed.

The rest of the book, more than half of its volume, comprises the subjects which form the importance, development, and pride of modern aural surgery. The acute middle-ear inflammations, their bacteriology, symptomatology, etc., receive 34 pages. Their occurrence in infants is duly dwelt upon.

In the chapter on the chronic purulent middle-ear inflammation the author by numerous illustrations of bacteriological and histological conditions and many pictures of the varied otoscopic appearances leads the reader through this extensive field of tedious observation (though not so discouraging as the chronic non-suppurative otitis media) into all the nooks and corners of this intricate system of cavities, the atrium with its diversified and irregular walls, the attic with its secluded chambers and their partition-walls, the ossicles, more or less abnormal in structure and position, the caries of the walls covered and impregnated with pus, debris of bone, cholesteatomatous masses, and polypoid granulation tissue. The reviewer is not aware that any one writer has given us such an exhaustive and authoritative description of these frequent and most important conditions as Politzer does on the next 49 pages of his book.

This is supplemented by a description of the peculiarities of the purulent middle-ear inflammations of infective disease—typhoid, scarlet fever, tuberculosis, syphilis.

Then follows a chapter (pp. 394–415) on the consequences of chronic otitis media, the various forms of caries and necrosis of the temporal bone and the ossicles, with their treatment by medicines and intra-aural surgical interference, the removal of the ossicles, etc.

This leads the way to the affections of the mastoid process (pp. 415–472). In the opinion of the reviewer, the author ascribes too great an importance to the full application of the antiphlogistic apparatus: Leiter-coil, painting with tincture of iodine, inunction of mercurial ointment, Crede's silver salve, etc. The reviewer thinks that in the initial period bed-rest and, as soon as the upper-posterior wall is sagging, a paracentesis accomplish more than all

other remedies together. When a mastoid abscess can plainly be recognized, Politzer thinks that early opening—on the fourth or fifth day—is unfavorable to a smooth and rapid recovery, for the disseminate foci of suppuration have had no time to mature and coalesce, which statement seems correct to the reviewer.

The description of the simple opening of the mastoid distinguishes itself by thoroughness and classical precision. Politzer thinks that the general practitioner should be able to do this operation, with which we agree. But where shall the general practitioner acquire his experience in countries in which otology is not yet on the programme in the final examination? Just in this department a course of clinical studies should, and we trust will, soon be obligatory.

In the section of the opening of the mastoid process and the antrum, Politzer repeats his assertion that the majority of mastoid abscesses do not communicate with the antrum, and that in these cases the middle-ear suppuration is recovered from more readily if the antrum is not opened. The antrum should be opened only when the probe discovers a communication between the usually hard portion of bone and the antrum, or later if the patient is not materially relieved. This opinion of Politzer's is entitled to due consideration, but the reviewer confesses to be one of those that seek the antrum in most cases.

The primary mastoid inflammation affecting the lining mucosa of the pneumatic cells is in the great majority of cases also produced by extension of bacterial infection from the naso-pharyngeal cavity, but it is found rarely in diploic mastoids (osteo-myelitis).

"The destructive processes in tympanum and mastoid originate in otorrhœas of childhood, rarely in chronic otitis of adults. The largest contingent are furnished by the infective diseases, tuberculosis and cholesteatoma." This certainly speaks the sense of every experienced aurist. These processes may run a latent course for years. The anatomical conditions, eburnation, caries, necrosis, abscess in different parts, are well described. They require the operative exposure of the middle-ear cavities. The indications and varieties of operative procedures are clearly presented. Politzer does not recommend the "radical" operation in advanced conditions of tuberculosis. He does many radical operations, and performs them safely and cleverly, of which the reviewer could satisfy himself, not long ago, as an eye-witness in Politzer's clinic. But he warns against the abuse of the operation.

He describes the operation in detail, with many illustrations, and with constant reference to the many difficult steps and dangerous points. It would be going too far should we quote only a part of the rules of safety and the proper execution of each procedure. Politzer describes and illustrates also the most popular methods of meatoplasty—Stacke's, Panse's, Körner's. Hartmann's fenestrated and grooved meatal forceps are depicted (p. 462) as particularly useful in slitting the membranous canal. Ballance's method, published recently (*Med.-Chir. Trans.*, vol. 83, 1900), is briefly described.

The after-treatment, frequently so tedious and embarrassing, receives a good deal of attention. The uncertainty of the prognosis concerning the preservation of the hearing function is shown by the statistics of Stacke and Grunert.

The otogenous intracranial affections, extra- and intra-dural abscess, diffuse and serous leptomeningitis ; the brain abscess in the temporal lobe and the cerebellum and metastatic abscesses ; furthermore the cerebral ulcer and the diffuse encephalitis as well as the affections of the cerebral sinuses and the internal carotid, viz., the inflammation of the lateral sinus, the thrombophlebitis of the superior and inferior petrosal, the cavernous sinus, and the jugular bulb ; finally the erosion of the internal carotid, are all scholarly described, with a good support from personal experience, though, it seems, not by such a wealth of personal pathological research as the author could marshal out in the tympano-mastoid diseases. Yet the presentation shows the conscientious utilization of all sources of available knowledge. The difficulty of the diagnosis of brain abscess and cerebellar abscess is presented and backed by the authors of incident publications (p. 488, etc.). The significance of the petro-squamous sinus, which Arthur H. Cheatle brought forward to the knowledge of the members of the VI. International Otological Congress and of which Dr. A. H. Cleveland described a case of pyæmia ending fatally (*Arch. of Otol.*, vol. xxiv., 1895), is fully brought forward.

The remainder of the work (pp. 506–684) does not appear to have received many additions after the appearance of the third edition.

Politzer's text-book is so complete and so conscientiously kept up that this fourth edition is as far ahead of the third as science has advanced after the year 1893. No one who possesses the last edition will dislike to be without the new one. For English

readers it may be agreeable to learn that the new edition is in the hands of two competent translators, who, under the supervision of the author,—whose clinical assistants they are,—will soon bring out an English translation of the fourth German edition.

H. K.

APPOINTMENTS.

Dr. OTTO KÖRNER, who, under the title of professor honorarius, was the official teacher of Otology, Rhinology, and Larnyngology at the University of Rostock, Mecklenburg, received a call to succeed the late Prof. Kuhn at Strassburg, which he declined, whereupon the Duke-Regent of Mecklenburg converted his position at Rostock into a professorship in ordinary. This is the first appointment of an aurist to the full functions and honors of an ordinary professor in Germany proper. In Austria the professorship in ordinary had been established long before.

Prof. URBANTSCHITSCH, of Vienna, has been appointed editor of the *Monatsschrift für Ohrenheilkunde*, vacant by the death of Prof. Jos. Gruber.

Prof. KÜMMEL, of Breslau, has been appointed the successor of the late Prof. Kuhn at Strassburg.

SOCIETY MEETING.

The *British Medical Association* will meet in Cheltenham, July 30 to Aug. 2. MARK HOVELL is to preside over the section of Laryngology, Rhinology, and Otology.